+56
V.44
no.1

NOVEMBER, 1904

IRVING K POND, DES.

LORADO TAFT, SCULPT

UNIVERSITY OF MICHIGAN
GENERAL LIBRARY

THE INLAND ARCHITECT AND NEWS RECORD

Entered at the Postoffice at Chicago as second-class matter.

CONTENTS

EDITORIAL:

Ownership of Drawings—What is Architecture?..... 25

VENTILATION..... 26

MUNICIPAL IMPROVEMENT..... 29

FERRO-CONCRETE..... 31

LOCKS AND BUILDERS' HARDWARE..... 32

WESTINGHOUSE TURBINES..... 32

OUR ILLUSTRATIONS..... 32

INDEX TO ADVERTISEMENTS..... ix

NORTH-WESTERN TERRA COTTA CO.

WORKS AND OFFICE:
Clybourn and Wrightwood Avenues.

BRANCH OFFICE: 1118 Rookery Building,
CHICAGO.

A NEW ROOFING TILE

WITH DOUBLE INTERLOCK AT TOP AND SIDES

ABSOLUTELY RAIN AND SNOW PROOF

NOW ON THE MARKET

Being made of stiff clay with metal dies under a pressure of fifty tons, it is both exceedingly light and dense, and will not break up nor flake off under the action of the elements. Better than other tile. As cheap as good slate.

THE NATIONAL TILE ROOFING CO.
LIMA, OHIO, U. S. A.

J. W. TAYLOR,

REMOVAL NOTICE:

After May 1, 1902, Monon Bldg., 324 Dearborn St. Telephone No. 1589 Harrison.

ARCHITECTURAL PHOTOGRAPHS,

BUILDINGS, INTERIORS, DETAILS, ETC.

Promise to purchase two dozen from the lot at $4.00 per dozen, unmounted, and I will send 200 from which to make the selection.

THE WINSLOW BROS. COMPANY

CHICAGO

ORNAMENTAL IRON AND BRONZE AND MONUMENTAL BRONZE STATUARY

The Winslow Elevator & Machine Company

HIGH GRADE ELECTRIC AND HYDRAULIC ELEVATORS

Trees and Shrubs

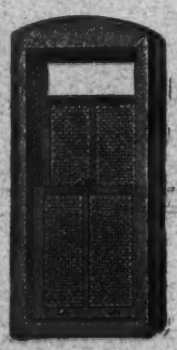
FINE VARIETIES
LOW PRICES

For both wholesale and retail trade

SEND FOR CATALOGUES

PETERSON NURSERY

Lincoln and Peterson Aves., CHICAGO, ILL.



JAMES A. MILLER & BRO.

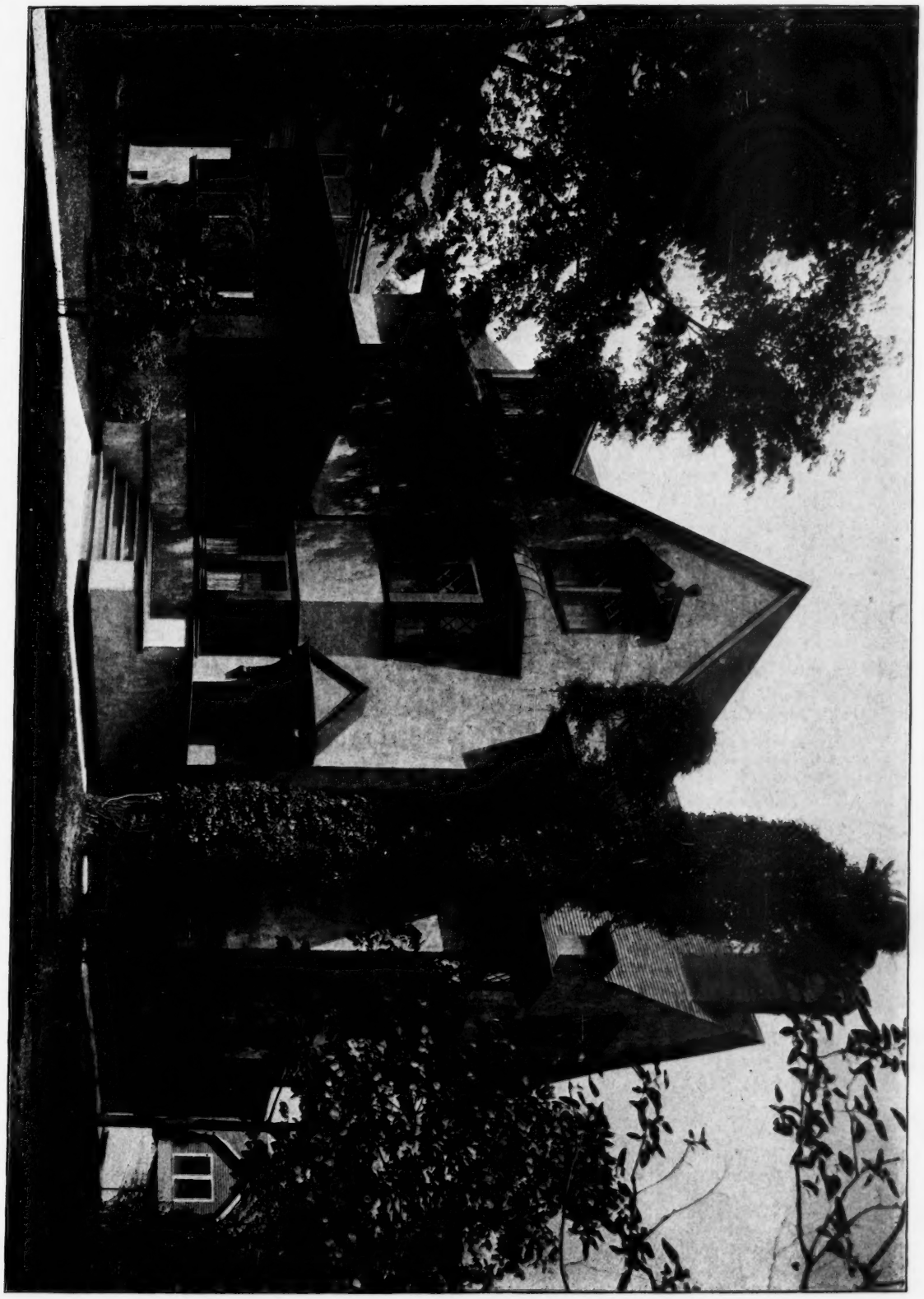
133 So. Clinton St., Chicago

Manufacturers

Fire Retarding Wire Glass Windows

Sheet Metal Frames and Sash

SKYLIGHTS, TILE, SLATE AND METAL ROOFING . . .

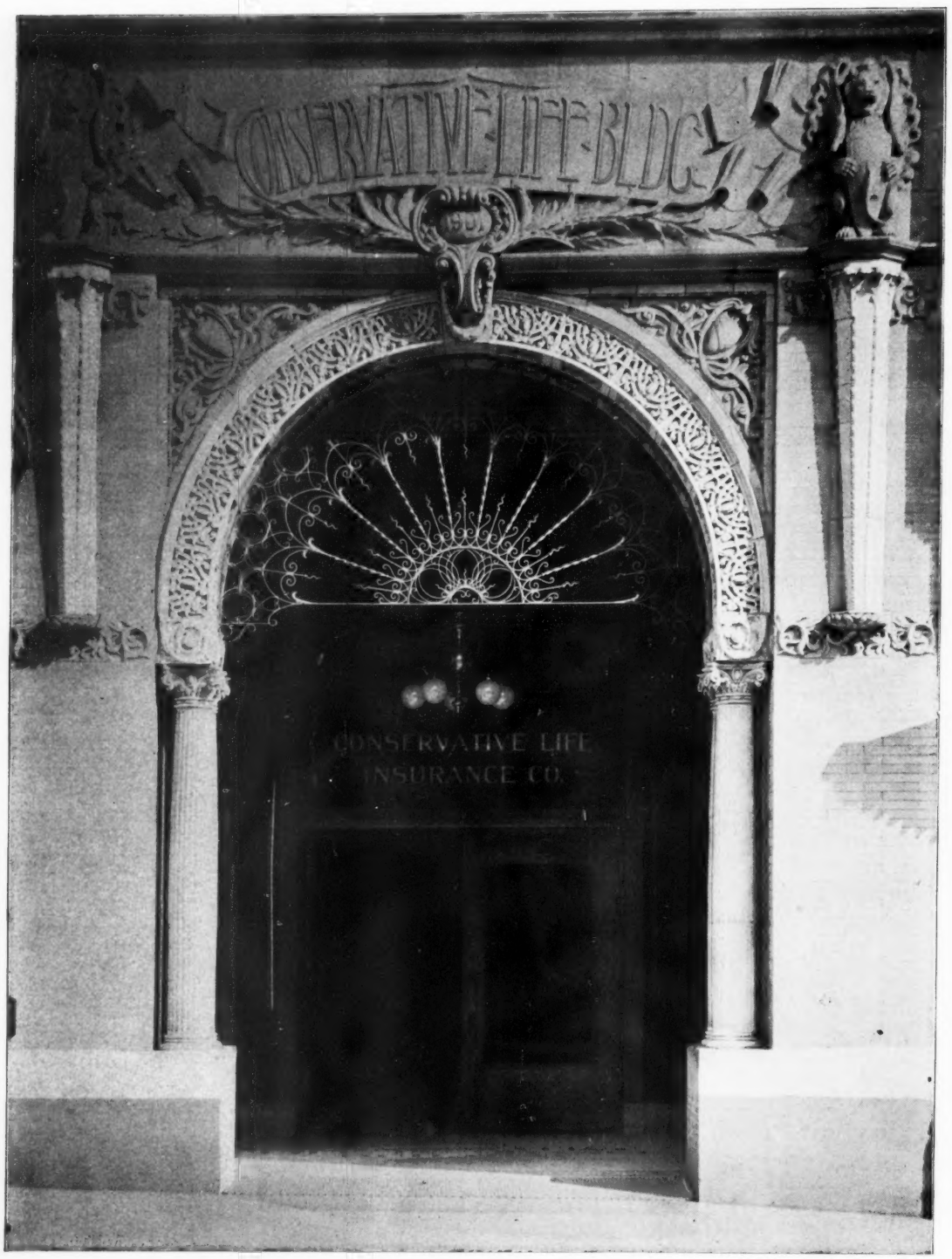


HOUSE OF C. G. LITTLE, EVANSTON, ILLS.

ERNEST A. MAYO, ARCHITECT, CHICAGO.

APARTMENT BUILDING, CHICAGO.

S. N. CROWEN, ARCHITECT.



ENTRANCE DETAIL, CONSERVATIVE LIFE BUILDING, LOS ANGELES, CAL.

TRAIN & WILLIAMS, ARCHITECTS.

STORE BUILDING, PASADENA, CAL.

John Parry, Photo.

JOHN PARKINSON, ARCHITECT.

POST OFFICE, OAKLAND, CAL.

John Parry, Photo.

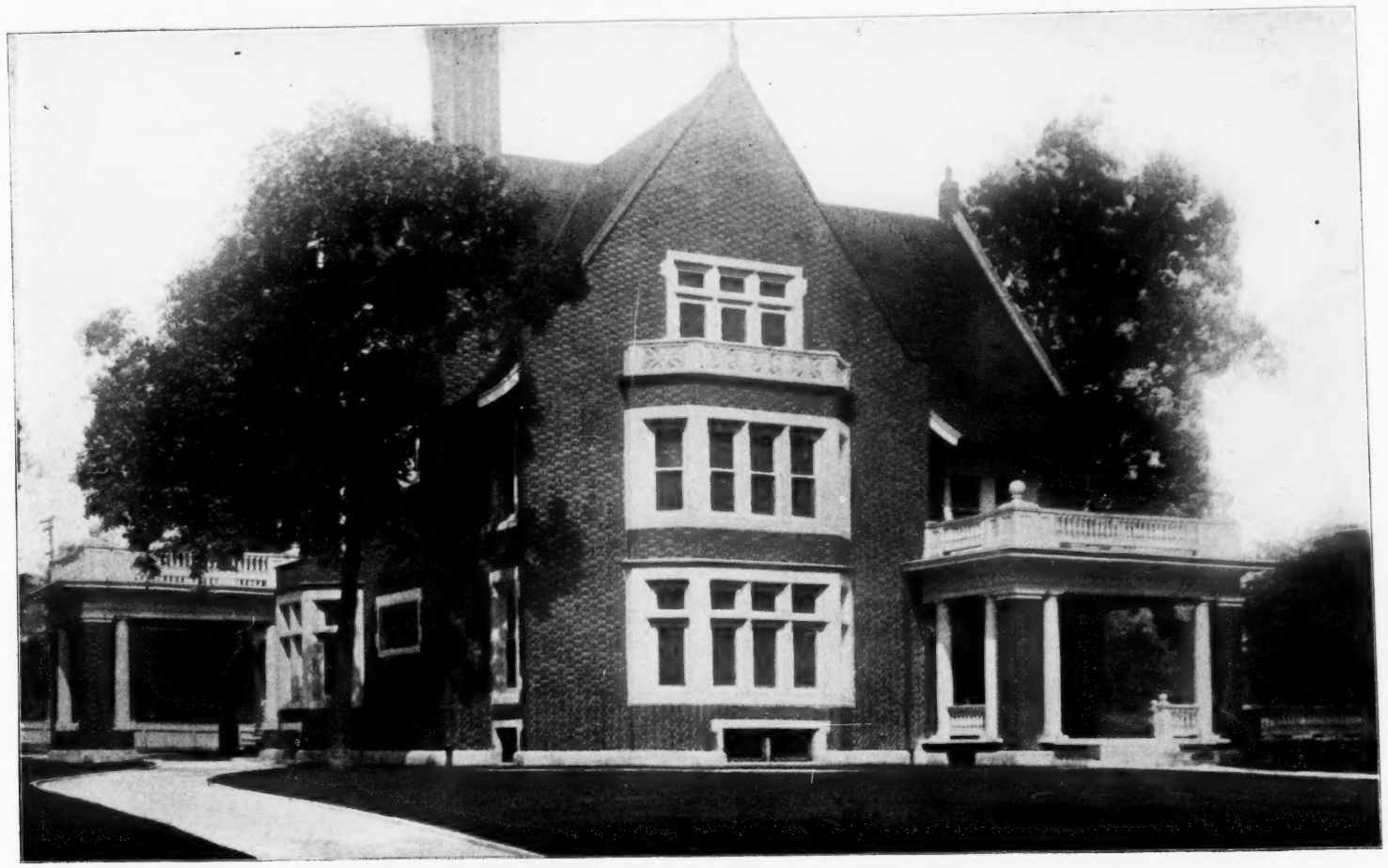
J. KNOX TAYLOR, ARCHITECT.

FOUNTAIN PARK CONGREGATIONAL CHURCH.

WEBER & GROVES, ARCHITECTS, ST. LOUIS, MO.

RESIDENCE OF GOV. HERRICK, CLEVELAND, O.

John Parry, Photo. MEAD & GARFIELD, ARCHITECTS.



RESIDENCE OF L. REYNOLDS, TOLEDO, O.

John Parry, Photo.

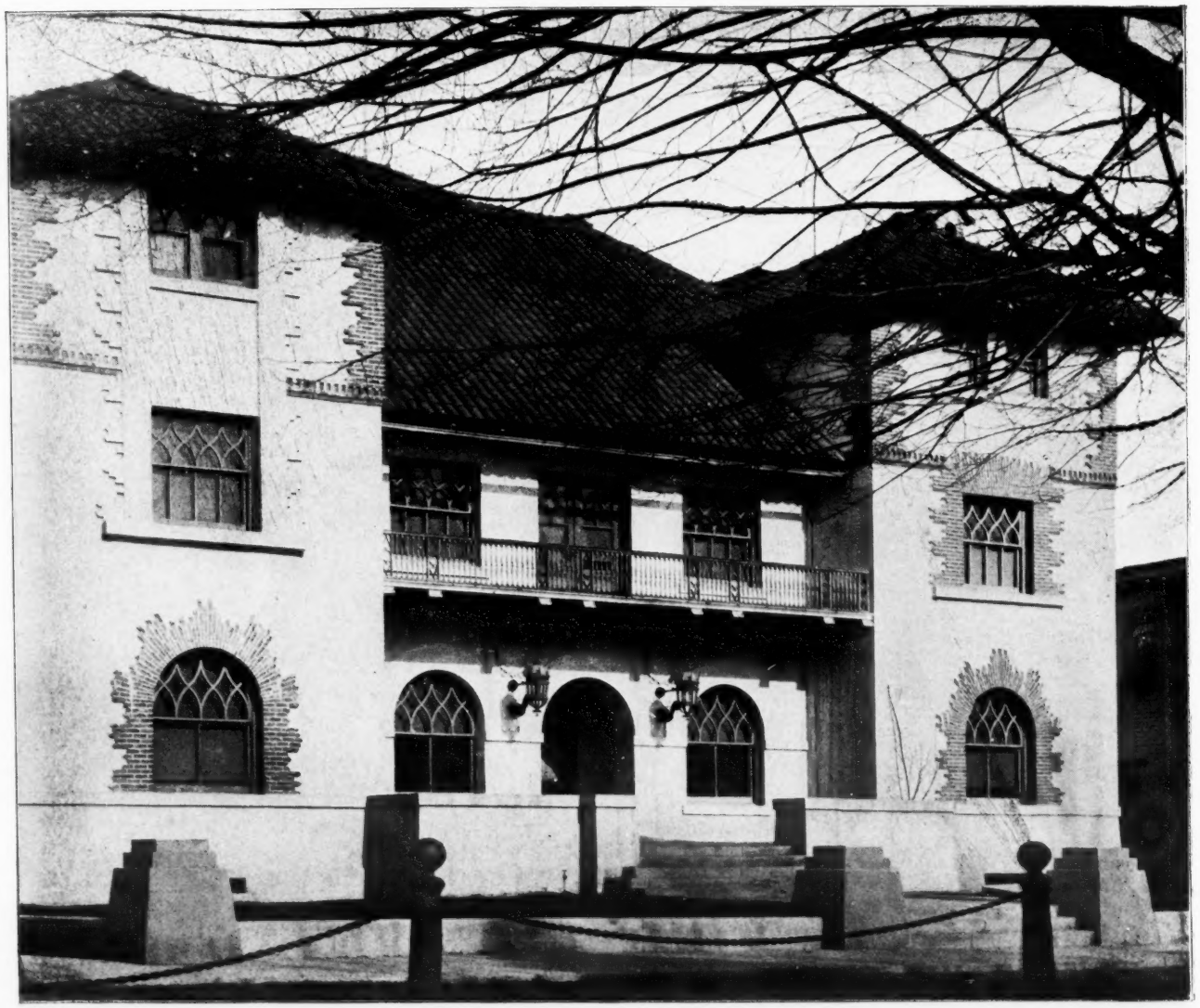
GEO. S. MILLS, ARCHITECT

HOUSE OF W. R. DONALDSON, ST. LOUIS, MO.

WEBER & GROVES, ARCHITECTS.

INTERIOR VIEW, THE NATIONAL BANK OF ST. JOSEPH, MO.

JENNEY & MUNDIE, ARCHITECTS, CHICAGO.

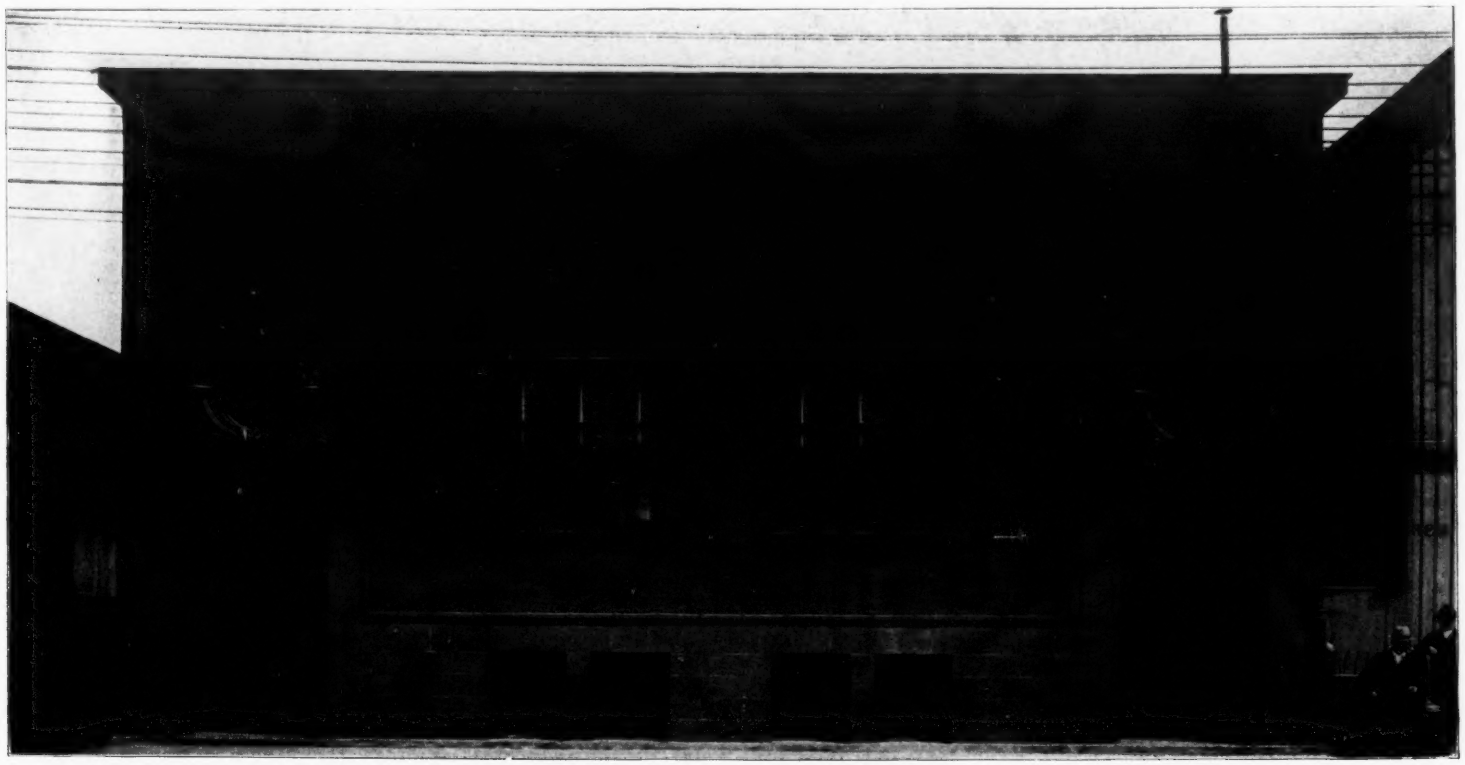


John Parry, Photo.

CLUB HOUSE, SAN JOSE, CAL.

HOUSE OF F. E. FRENCH, EVANSTON, ILLS.

ERNEST A. MAYO, ARCHITECT, CHICAGO.

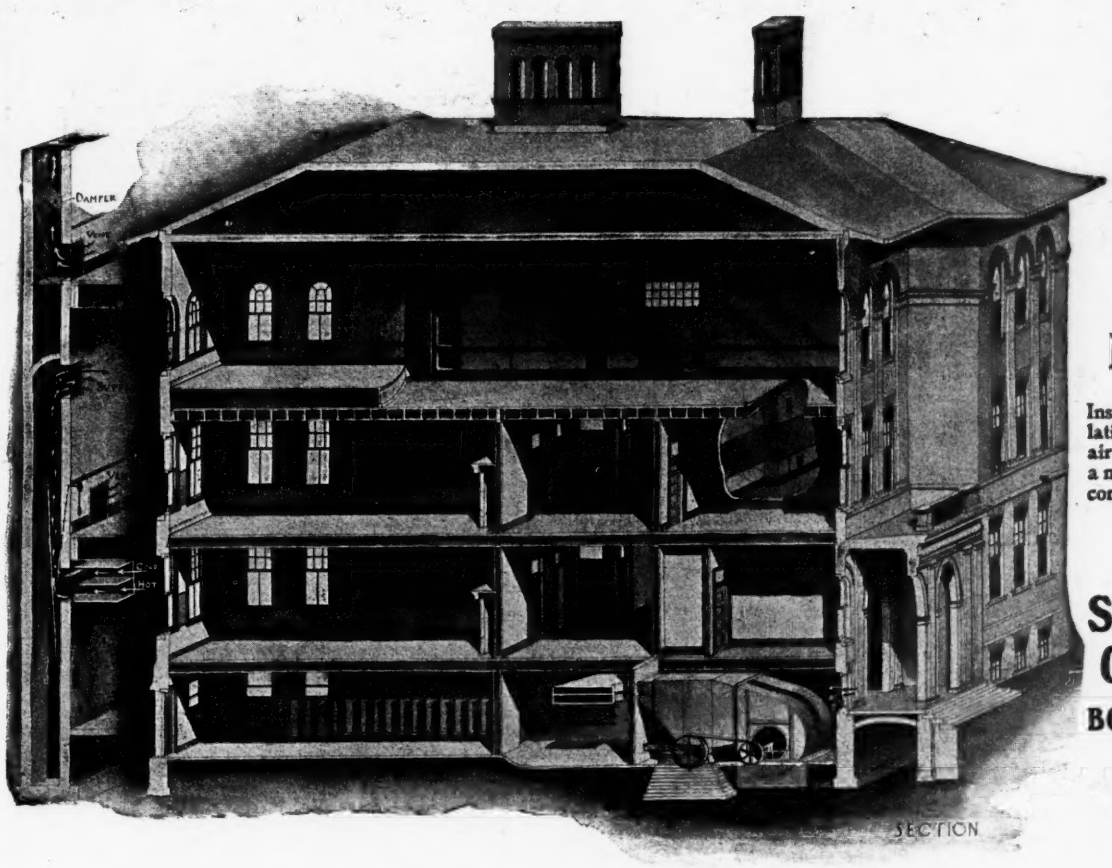


PUBLIC BATH, CHICAGO.

Chicago Architectural Photographing Co. Photo.

R. BRUCE WATSON, ARCHITECT

THE STURTEVANT SYSTEM



OF

SCHOOL-HOUSE VENTI-LATION and HEATING

Insures positive ventilation at all times with air properly tempered and thermostatically controlled.

B. F. Sturtevant Company

BOSTON, MASS.

NEW YORK
PHILADELPHIA
CHICAGO
LONDON

315

Bees have been putting up their honey in six-sided cells for six thousand years because no better way has been found. Neither has the process of making "Taylor Old Style" roofing tin been improved by any modern invention.

N. & G. TAYLOR CO.
Established 1810
PHILADELPHIA

"Rufus the Roofer" is a breezy booklet in which the roof question is threshed out in a new vein. It will be sent to any one on receipt of 10 cents in stamps, and is worth more than that simply as entertaining reading.

Colorado—

That's the title of a handsome new book of seventy-two pages, beautifully printed, bound and illustrated; fifty-six pictures of Colorado's matchless mountains, canons, streams, lakes and forests.

The book is written in a most delightful vein, and gives pleasing glimpses of a mountain world whose colossal beauty never wearies or changes or grows old. A splendid map of Colorado is appended.

It is not a guide book, but contains a few paragraphs about the best way to reach Colorado from everywhere east and southeast via Chicago or St. Louis (Louisiana Purchase Exposition) and the Burlington Route, with its splendidly equipped one-night-on-the-road fast express trains.

Mailed anywhere upon receipt of ten cents in stamps or coin.

Burlington Route

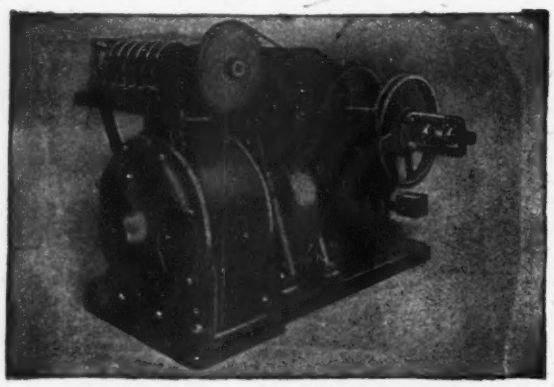
P. S. EUSTIS,
Passenger Traffic Manager
P4 CHICAGO.

Please mention the INLAND ARCHITECT when corresponding with advertisers

Westinghouse

Alternating and Direct Current

Motors



Westinghouse Type C Induction Motor geared to Elevator Hoist.

In universal use for all kinds of service, because they

Do The Work

Alternating Current, Circulars 1050, 1062, 1066
Direct Current, Circulars 1042, 1068, 1077

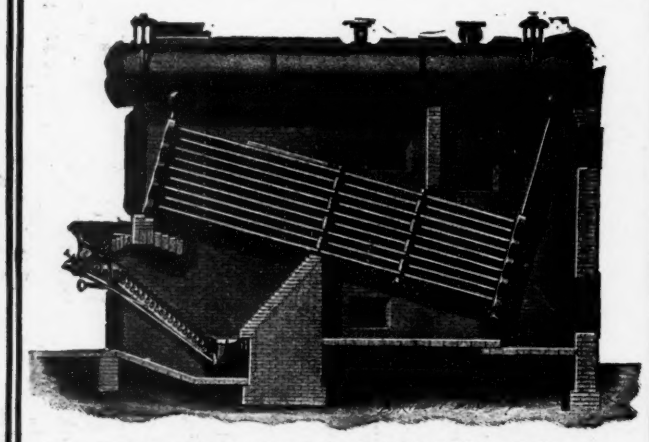
Write for them; address

Westinghouse Electric & Mfg. Co.

Sales Offices in all Large Cities **Pittsburg, Pa.**

For Canada: Canadian Westinghouse Co., Ltd., Hamilton, Ontario.

The Roney Stoker



The Roney Stoker as applied to Babcock & Wilcox Boiler.

Effects smokeless combustion of soft coal.

For particulars address nearest sales office of

The Westinghouse Machine Co.,

Works, East Pittsburg, Pa.

Sales Offices

New York, 10 Bridge St. Chicago, 171 La Salle St.
Boston, 131 State St. Detroit, Union Trust Bldg.
Pittsburg, Westinghouse Bldg. Philadelphia, Stephen Girard Bldg.

Designers and Builders of

Steam Engines, Gas Engines, Steam Turbines, Roney Mechanical Stokers.

THE WINKLE TERRA COTTA CO.

MANUFACTURERS OF

Architectural Terra Cotta

IN ALL COLORS.

OFFICE:

Rooms 502 and 503, Century Building,

ST. LOUIS, MO.

Works: CHELTENHAM, ST. LOUIS.

THE CHICAGO

The Typewriter That Stands for Fair Play

No one thinks that any typewriter is worth $100, yet that is the "standard price." Every one knows that highest grade machines can be sold at a fair profit for much less.

$35 Is the Price of The Chicago, the Best Machine at any Price,

yet a number of people by a kind of "trustful momentum" keep on paying $100—they are "not quite sure." We have some surety facts that will make your pocketbook laugh—better send for them to-day.

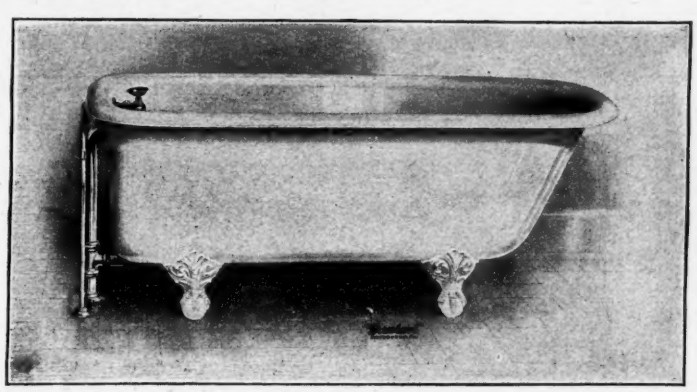
Chicago Writing Machine Co.

121 Wendell Street - - - - - CHICAGO

Please mention THE INLAND ARCHITECT when corresponding with Advertisers.

"Standard"
PORCELAIN ENAMELED BATHS

surpass all others in quality, design and durability, and the large numbers of exclusive patterns in which they are made permit the selection of a bath that will harmonize with the decorative treatment of the bathroom, no matter how modest or elaborate it may be.



THE "OCCIDENT"

PLATE 101-G

is the choice of many who desire a sanitary, modern equipment without expending more than is necessary to provide these most essential features. The "Occident" is made in five sizes, with trimmings as shown; also with Imperial Waste and Overflow or Bell Supply Fittings.

The exterior finish of the bath is a matter worthy of the consideration of every architect. The "Standard" Bath Decorations, as applied by skilled decorators, with special facilities for the purpose, makes the exterior as inviting as the interior. The reasonable cost at which we furnish exterior finishes should cause every bath to be specified with one of our factory finishes, thus insuring satisfaction to the client, instead of the expense and annoyance resulting from the application of ordinary paint by unskilled hands.

Every piece of "Standard" Ware bears our "GREEN and GOLD" guarantee label and has our name "Standard" or initials "S. S. M. Co." cast in relief on the exterior. No others are genuine.

Standard Sanitary Mfg. Co.

PITTSBURG, U. S. A.

PORCELITE

Is the Only Enamel Paint

That has stood the test of **ten** years' wear and retained its durability, permanent **high gloss,** and has not **checked or cracked.** :: :: :: ::

Interior Woodwork
Plastered Walls
Brickwork, Metals

Paint with

PORCELITE

The Thomson Wood Finishing Co.

Varnish, Enamel and Wood Filler Manufacturers
Inventors and Sole Makers

Office, 115 N. Fourth Street
PHILADELPHIA, PA.

Butcher's Boston Polish

Is the best finish made for FLOORS, Interior Woodwork and Furniture

Not brittle; will neither scratch nor deface, like shellac or varnish. Is not soft and sticky, like beeswax. Perfectly transparent, preserving the natural color and beauty of the wood. Without doubt the most economical and satisfactory POLISH known for HARDWOOD FLOORS.

For Sale by Dealers in Paints, Hardware and House Furnishings.

Send for our FREE BOOKLET, telling of the many advantages of BUTCHER'S BOSTON POLISH.

THE BUTCHER POLISH CO.,
356 Atlantic Avenue, Boston, Mass.

Our No. 3 Reviver is a superior finish for kitchen and piazza floors.

Your Best Buildings

Reproduced exactly from Photographs by our

HALF-TONE PROCESS

and issued in book or pamphlet form would constitute an attractive Souvenir, and a pleasant introduction to Prospective Clients . . .

We will make half-tone pictes (our best work) at LOWER PRICES than you can get elsewhere—probably 30 to 40 per cent less.

. . . . . Send for prices, stating sizes and number of plates wanted.

INLAND PUBLISHING CO.

610 Manhattan Building, - - - - - CHICAGO.

ORNAMENTAL IRON

STAIRS

STORE FRONTS

ELEVATOR ENCLOSURES

FENCES AND RAILINGS

SIDEWALK LIGHTS

SKYLIGHTS

Brown Bros. Mfg. Co.

Established in 1860

22d St. and Campbell Avenue

CHICAGO

Telephone Canal 115

DEXTER PORTLAND CEMENT CO. FINENESS STRENGTH TRADE MARK PORTLAND UNIFORMITY NAZARETH PA.

Dexter Portland ...Cement...

Highest Standard Attainable for Pavement and Concrete Work.

SAMUEL H. FRENCH & CO., Sole Agents,

Established 1844. PHILADELPHIA.

TEL. HARRISON 3652

THOMAS HAWKES

LANDSCAPE ARCHITECT

DESIGNS PREPARED FOR PARKS, CEMETERIES, PRIVATE ESTATES, SUB-DIVISIONS, ETC.

CORRESPONDENCE SOLICITED

1832 MONADNOCK BLOCK CHICAGO

"CLASSIK" METAL

CEILINGS

Were given the highest honors by the Committee on Awards, at the Louisiana Purchase Exposition, because of their merit and artistic beauty

GOLD MEDAL

"Classik" Ceilings are known the world over for their exclusiveness of classified designs. We originated these designs and they have no equal

The Berger Mfg. Co.

Canton, Ohio

New York Boston Philadelphia St. Louis

Every Architect is interested in the problem of the perfect lighting of the modern show window. It should be well lighted, if at all.

FRINK'S SPECIAL PATENT WINDOW REFLECTOR

Does the work in a brilliant, effective manner. No glare in the eyes from the direct light to obscure the vision. Shows up a display to best possible advantage. Investigation invited.

I. P. FRINK, 551 Pearl St., New York.

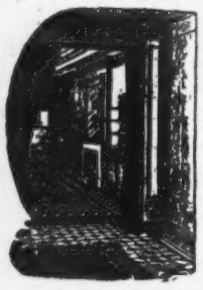
EXPANDED METAL

For Fireproofing and Concrete Construction

ASSOCIATED EXPANDED METAL COMPANIES Room 1216, 256 Broadway NEW YORK

CRANE FITTINGS

ESTABLISHED 1855



Hardwood Floors

Wood Carpets, Parquet Floors, Rug Borders.

Send for book of designs.

E. B. MOORE & CO.

76 Wabash Avenue, CHICAGO, ILL.

Put into the White House by the U. S. Government.

SEALS WITH OR WITHOUT WATER

CUDELL ANTI-SYPHON

F. E. CUDELL'S

Patent Sewer-Gas and Backwater Trap

For Wash-Bowls, Sinks, Bath and Wash Tubs,

CLEVELAND, OHIO.

CONVENIENT TRAINS

Leave St. Paul and Minneapolis daily

. . VIA . .

Wisconsin Central R'y

. . FOR . .

MANITOWOC, MILWAUKEE, CHICAGO,

where direct connections are made for the East and South.

Nearest ticket agent can give you complete information.

JAS. C. POND, Gen. Pass. Agent, MILWAUKEE, WIS.

Hydraulic Press Brick Co.

Missouri Trust Building, ST. LOUIS, MO.

TOTAL ANNUAL CAPACITY, 300,000,000 BRICKS.

American Hydraulic Press Brick Co.,	St. Louis, Mo.
Chicago Hydraulic Press Brick Co.,	Chicago, Ill.
Cleveland Hydraulic Press Brick Co.,	Cleveland, Ohio.
Eastern Hydraulic Press Brick Co.,	Philadelphia, Pa.
Findlay Hydraulic Press Brick Co.,	Findlay and Toledo, Ohio.
Illinois Hydraulic Press Brick Co.,	St. Louis, Mo.
Kansas City Hydraulic Press Brick Co.,	Kansas City, Mo.
Kelley Brick & Tile Co.,	West Superior, Wis.
Menomonie Hydraulic Press Brick Co.,	Minneapolis, Minn.
New York Hydraulic Press Brick Co.,	Rochester, N. Y.
Ohio Press Brick Co.,	Zanesville, Ohio.
Omaha Hydraulic Press Brick Co.,	Omaha, Neb.
Union Press Brick Works,	St. Louis, Mo.
Washington Hydraulic Press Brick Co.,	Washington, D. C.

AT THE TOP

U. S. EAGLE

N. M.

(NEW METHOD)

TERNES

have no superior for roofing purposes. They are the result of a more perfect development of our famous **MF** brand. made entirely by the palm oil process, and extra heavy coated.

Architects, contractors and roofers find U. S. Eagle N. M. Roofing Tin most satisfactory. It is thoroughly trustworthy under all conditions of weather, and in any climate. Lasts a lifetime. For sale by first-class wholesale metal houses throughout the country.

SAMPLE, POST PAID, ON FEQUEST

American Sheet & Tin Plate Co.

Frick Building, Pittsburg, Pa.

MISSOURI PACIFIC RAILWAY AND IRON MOUNTAIN ROUTE,

KNOWN AS THE GREAT SOUTHWEST SYSTEM.

Connecting the Commercial Centers and Rich Farms of

MISSOURI,

The Broad Corn and Wheat Fields and Thriving Cities of

KANSAS,

The Fertile River Valleys, Trade Centers and Rolling Prairies of

NEBRASKA,

The Grand, Picturesque and Enchanting Scenery, and the Famous Mining Districts of

COLORADO,

The Agricultural, Fruit, Mineral and Timber Lands, and Famous Hot Springs of

ARKANSAS,

The Sugar Plantations and immense Rice Fields of

LOUISIANA,

The Cotton and Grain Fields, the Cattle Ranges and Winter Resorts of

TEXAS,

Historical and Scenic

OLD AND NEW MEXICO,

And forms with its Connections the Popular Winter Route to

CALIFORNIA

For descriptive and illustrated pamphlets of any of the above States, address Companies' Agents, or

H. C. TOWNSEND,
General Passenger and Ticket Agent,
ST. LOUIS.

Interlocking Rubber Tiling

As laid by us in The Reid Memorial Library, Passaic, N. J.

Waterproof, sanitary, non-slippery, soft, warm and comfortable to the feet, noiseless, capable of elegant designs and extraordinarily durable. Laid without disturbing old floor. A perfect floor for kitchens, laundries, pantries, halls, vestibules, offices, banking-rooms, court-rooms, schoolrooms, libraries, hospital-wards, cafes, billiard-rooms, piazzas, etc.

Call or write.

Beware of Infringers. Patented. Manufactured solely by

NEW YORK BELTING & PACKING CO., Ltd.

CHICAGO . . . . 150 Lake Street
NEW YORK . 91 and 93 Chambers St.
PHILADELPHIA 724 Chestnut Street
BALTIMORE { Baltimore Rubber Co. 41 South Liberty St.
BOSTON . . . 232 Summer Street
INDIANAPOLIS, IND. 229 S Meridian St.
ST. LOUIS . . 411 North 3d Street
SAN FRANCISCO . 605-607 Mission St.
LONDON, ENG.
Arthur L. Gibson & Co.
19 to 21 Tower Street, Upper St. Martin's Lane, W. C.

Avoid Extremes of Heat and Cold

BY USING

THE POWERS SYSTEM

OF

Temperature Regulation.

Applicable to all kinds of heating apparatus in Schools, Churches, Residences, Office Buildings, etc.

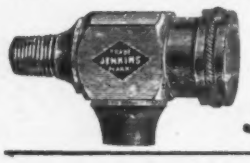
Successfully applied to the control of heat in RAILWAY CARS.

SEND FOR CATALOGUES.

The Powers Regulator Co.

111 Fifth Avenue, New York 40 Dearborn Street, Chicago

Jenkins Improved Automatic Air Valves



Suitable for high or low pressure. Take no more room than an ordinary air cock. Endorsed by the leading steam experts as the best made and the quickest working. All genuine stamped with our Trade-Mark.

JENKINS BROS., NEW YORK BOSTON CHICAGO PHILADELPHIA

POROUS FIREPROOFING

Illinois Terra Cotta Lumber Co.

Manufacturers and Contractors for the Fireproofing of Buildings

OFFICE

439 "The Rookery," CHICAGO

Telephone, HARRISON 1705 WORKS AT PULLMAN

FLORIDA?

Yes, I'm going.

Well, there's *something new* for you to consider.

THE SOUTHERN RAILWAY

in connection with the

Queen & Crescent Route

will take you *down one way* and *bring you back another*, for a slight advance in the regular winter tourist rate.

Low round-trip rates now in effect to all tourist points in Florida and the South.

Good connections, through sleepers, fine equipment, best of everything.

On January 11, 1904, the "*Chicago & Florida Special*" and the "*Florida Limited*," with through Pullman sleepers, dining, club and observation cars, will again go into service, Chicago to St. Augustine, via Cincinnati, Chattanooga, Atlanta and Jacksonville.

For through sleeping-car reservations, literature and full particulars, write

J. S. McCULLOUGH,
N. W. P. A.,
225 Dearborn St.,
'Phone Harrison, 1813. CHICAGO, ILL.

G. B. ALLEN, G. P. A., St. Louis, Mo.

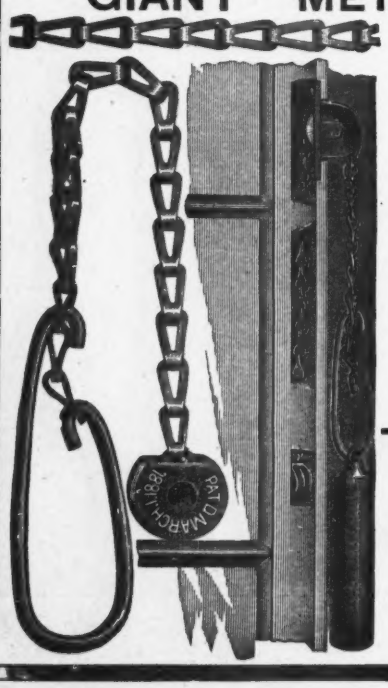
Sheet-Steel Indian Canoes

Non-sinkable and indestructible. 14 feet long, 39 inch beam.

Twenty-Two Dollars, Net. EXTRA FOR FREIGHT, OAR AND CENTERBOARD. BOAT.

W. H. MULLINS, 310 Depot St., SALEM, OHIO.

"GIANT" METAL SASH CHAIN



Has not been equaled in quality in 20 years. Durability guaranteed. The bronze costs 40 per cent more than any other Sash Chain metal.

Full line of Sash and Cable Chains, Sash Pulleys and Fixtures.

MANUFACTURED BY

THE SMITH & EGGE MFG. CO.

BRIDGEPORT, CONN.

WRITE FOR OUR LATEST CATALOGUE.

"THE ONLY WAY"

BETWEEN

CHICAGO
ST. LOUIS
KANSAS CITY
AND
PEORIA

Handsomest, most luxurious trains in the world; completely rock-ballasted roadbed, no dust, no dirt, no smoke, no cinders.

THE ALTON'S 1905 GYPSY GIRL ART CALENDAR

Copyright, 1904, by the Chicago & Alton Railway Co.

Sequel to the famous "Fencing" and "Cow-Boy" Girl Art Calendars.

FIVE SHEETS, EACH 10 X 15 INCHES

SEND 25 CTS.

with name of publication in which you read this advertisement, to GEO. J. CHARLTON, General Passenger Agent, Chicago & Alton Railway, Lock Box 618 CHICAGO, ILL., and get the handsomest calendar of the year. Four graceful poses in colors, unmarred by advertisements and ready for framing.

Architects' Specification Reminders.*

Architectural Drawing. — Page
Deane, E. Eldon XV

Architectural Iron Works.
The Winslow Bros. Co..... II
Brown Bros. Mfg. Co V
American Sidewalk Light Co. IX

Architectural Photographers.
Taylor, J. W..... II

Architectural Views.
Taylor, J. W..... II

Bath Room Fixtures.
Standard Sanitary Mfg. Co. V

Bath Tubs.
Standard Sanitary Mfg. Co. V

Blinds and Screens.
Wilner Mfg. Co., Milwaukee, Wis..... ..

Boats.
W. H. Mullins..... VIII

Boiler Covering.
The Keasbey & Mattison Co. XII

Brass Goods (Plumbers').
Standard Sanitary Mfg. Co. V

Bricks (Pressed).
Chicago Hydraulic Press Brick Co IX
Findlay Hydraulic Press Brick Co IX
Illinois Hydraulic Press Brick Co IX
Kansas City Hydraulic Press Brick Co IX
Menominee Hydraulic Press Brick Co IX
Omaha Hydraulic Press Brick Co IX
St. Louis Hydraulic Press Brick Co IX

Brick (Enameled).
Hydraulic Press Brick Co ... IX

Brick (Ornamental).
Chicago Hydraulic Press Brick Co IX
Findlay Hydraulic Press Brick Co IX
Hydraulic Press Brick Co ... IX
Illinois Hydraulic Press Brick Co IX
Kansas City Hydraulic Press Brick Co IX
Menominee Hydraulic Press Brick Co IX
Omaha Hydraulic Press Brick Co IX

Builders' Hardware.
Orr & Lockett..... XVI
The Yale & Towne Mfg. Co. XVI

Builders' Sundries.
The Yale & Towne Mfg. Co. XVI

Building Papers.
Cabot, Samuel XII

Cements.
French, S. H., & Co VI

Closets.
Standard Sanitary Mfg. Co. V

Conduit.
National Fireproofing Co... 36

Cordage.
Samson Cordage Works XVI

Creosote Stains.
Cabot, Samuel XII

Drawing Material and Implements.
Abbott, A. H., & Co..... XII

Drinking Fountains. — Page
Standard Sanitary Mfg. Co. V

Electric Plants.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Elevators.
Link Belt Machinery Co.... XII
The J. W. Reedy Elevator Co XIII

Enameled Iron (Plumbers' Ware).
Standard Sanitary Mfg. Co. V

Engineers.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Fireproof Doors.
Kinnear Mfg. Co. X

Fireproof Shutters.
Kinnear Mfg. Co..... X

Fireproofing.
Associated Expanded Metal Co's. VI
Illinois Terra Cotta Lumber Co. VIII
National Fireproofing Co .. XIV
Pioneer Fireproofing Co.... XIV
The Roebling Construction Co..... XII

Floor Polish.
Butcher Polish Co V

Fuel Economizers.
B. F. Sturtevant Co III

Gas Engines.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Hardware.
The Yale & Towne Mfg. Co. XVI

Heating.
B. F. Sturtevant Co III

Heating and Ventilating Apparatus.
Pierce, Butler & Pierce..... XVI
B. F. Sturtevant Co III
Kellogg-Mackay-Cameron Co. XI

Hollow Block.
National Fireproofing Co... 36

Ice and Refrigerating Machinery.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Laundry Tubs.
Standard Sanitary Mfg. Co. V

Lavatories.
Standard Sanitary Mfg. Co. V

Lead Pipe.
Standard Sanitary Mfg. Co. V

Locks.
The Yale & Towne Mfg. Co. XVI

Mail Chutes.
Cutler Manufacturing Co... XIII

Marble.
Standard Sanitary Mfg. Co. V

Mechanical Stokers.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Metal Ceilings. — Page
Berger Mfg. Co VI

Mortar Colors.
French, S. H., & Co..... VI

Moldings, Mirrors, Frames.
W. W. Abbott..... IX

Paints, Oils and Varnishes.
Berry Bros VIII
Joseph Dixon Crucible Co.. X
New Jersey Zinc Co X
Pitkin, Geo. W., Co..... II
Smith, Edward, & Co XVI
Thomson Wood Finishing Co. V

Pencils.
Joseph Dixon Crucible Co .. VI

Plumbers' Fittings.
Standard Sanitary Mfg. Co. V

Plumbers' Ware, Porcelain Enameled
Standard Sanitary Mfg. Co. V

Printers.
The H. O. Shepard Co VII

Railroads.
Baltimore & Ohio R. R XII
Big Four Route XIII
Chicago & Alton..... VIII, X
Chicago, Burlington & Quincy R'y..... III
Chicago & North-Western R'y X
Chicago, Milwaukee & St. Paul..... ..
Delaware, Lackawanna & Western XIV
Denver & Rio Grande R. R. IV
Grand Trunk Lines IX
Illinois Central XV
The Lake Shore Route XVI
Monon and C. H. & D. Route XI
Michigan Central R. R..... X
Missouri Pacific R'y VII
New York Central R. R..... XI
Northern Pacific R. R..... X
Queen & Crescent Route.... XI
Rock Island System XIV
Rio Grande & Western..... VI
Southern R'y VIII
Southern Pacific Co... XI
Santa Fe Route X
Wisconsin Central..... VI

Range Closets.
Standard Sanitary Mfg. Co. V

Reflectors.
Frink, I. P..... VI

Roofing Tile.
National Tile Roofing Co.... II
Celadon Roofing Tile Co., Manufacturers of Highest Grade Roofing Tile, 204 Dearborn St., Chicago; 156 Fifth Ave., New York. Factories: Alfred, N. Y. and Ottawa, Ill. .....

Roofing Tin.
American Tin Plate Co VII
N. & G. Taylor Co III

Rolling Doors and Shutters (steel).
Kinnear Mfg Co X

Rubber Tiling.
New York Belting and Packing Co VII

Sanitary Appliances.
Cudell, F. E..... IX
Standard Sanitary Mfg. Co. V

Sanitary Woodwork. — Page
Standard Sanitary Mfg. Co. V

Sash Cords and Chains.
Smith & Egge Mfg. Co VIII
Samson Cordage Works.... XVI

Sheathing and Deadening Quilt.
Cabot, Samuel XII

Shingle Stain.
Berry Bros VIII
Cabot, Samuel XII
Dexter Bros..... XV

Showers, Permanent and Portable.
Standard Sanitary Mfg Co. V

Sidewalk and Vault Lights.
Brown Bros. Mfg. Co V
American Sidewalk Light Co. IX

Sinks, Porcelain Enameled.
Standard Sanitary Mfg. Co. V

Snow Guards.
Folsom Snow Guard Co..... IX

Spring Hinges.
Smith & Egge Mfg. Co..... VIII

Stained and Decorative Glass.
Louis J. Millet XIV

Steam Engines.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Steam Loops.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Steel Rolling Doors.
Kinnear Mfg. Co X

Steel Rolling Shutters.
Kinnear Mfg. Co..... X

Steel Shutters.
American Sidewalk Light Co. IX
Kinnear Mfg. Co X

Stokers.
Westinghouse, Church, Kerr & Co IV
The Westinghouse Machine Co IV

Temperature Regulator.
The Powers Regulator Co... VIII

Terra Cotta.
Northwestern Terra-Cotta Works..... II
Winkle Terra Cotta Co IV

Tile (Rubber).
New York Belting & Packing Co., Ltd..... VII

Trees.
Peterson Nursery II

Urinals, Porcelain Enameled.
Standard Sanitary Mfg. Co. V

Valves (Steam).
Jenkins Bros..... VIII

Vimometers.
Standard Sanitary Mfg. Co. V

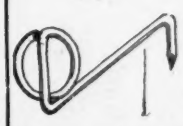
Window Lines.
Samson Cordage Works.... XVI

Wood Floors.
Moore, E. B., & Co..... VI
National Wood Floor Co.... XII

*Roman figures refer to advertising pages.

GRAND TRUNK RAILWAY SYSTEM
SOLID THROUGH TRAINS
BETWEEN
CHICAGO, BUFFALO, NEW YORK AND PHILADELPHIA
"VIA NIAGARA FALLS."
Also to BOSTON via the important business centers of CANADA and NEW ENGLAND.
For Information, Time Tables, etc., apply to any Agent of the Company, or to
GEO. W. VAUX,
ASST. GEN. PASS. & TKT. AGT.,
135 ADAMS ST.,
CHICAGO.

Folsom New Model Snow Guard



Specified by leading architects to hold the snow on all pitch roofs, entirely obviating all chance of injury to life or to the property it protects. The only perfect device for this purpose. It is made in various forms for old and new roofs of slate, shingle, tile or metal. Full information on application.

THREE HISTORIC BUILDINGS.

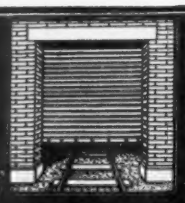
Faneuil Hall,
Old South Church,
King's Chapel,
Boston,

Are Fitted with this Snow Guard.

FOLSOM SNOW GUARD CO.

ROSLINDALE (BOSTON), MASS.

KINNEAR
STEEL ROLLING
DOORS SHUTTERS
SEND FOR CATALOGUE



BOSTON - 85 WATER ST.
NEW YORK - 45 VESEY ST.
CHICAGO - 112 CLARK ST
PHILADELPHIA - 1011 CHESTNUT ST
THE KINNEAR MFG. CO. COLUMBUS OHIO, U.S.A.

THE UNIFORM STANDARD CONTRACT,
REVISED AND IMPROVED.

All Orders Filled at Once by the Publishers,
THE INLAND PUBLISHING CO.,
602-603 Star Building, - - - CHICAGO.

One Quality Double the Life Four Colors
of Steel Work and Metal Surfaces
by Painting With
Dixon's Silica-Graphite Paint
Joseph Dixon Crucible Co. Jersey City, U.S.A.

GRAND TRUNK RAILWAY SYSTEM

Chicago
TO
Quebec

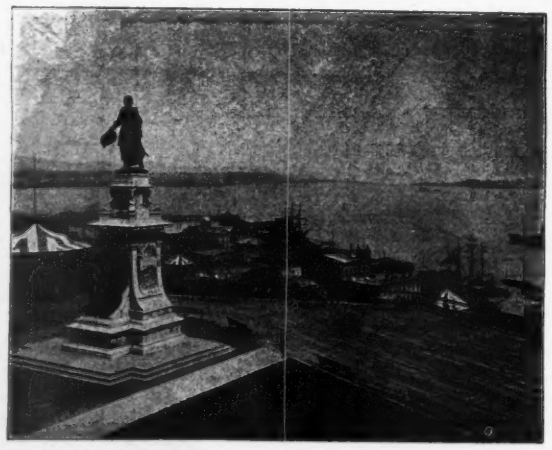
Do not go to Europe to see a 16th Century city; accessible by the

Grand Trunk Ry. System
FOR
$38.85 Round Trip. Return limit Oct. 31, '04
Stop-over privileges allowed en route

$4 additional will give you the St. Lawrence River trip from Toronto to Montreal.

$3 additional from Kingston to Montreal.

Send for descriptive folder to
GEO. W. VAUX
A. G. P. A.
Grand Trunk Ry. System
CHICAGO



Fall Days are Painting Days

The atmosphere is clean and dry, and the paint has every chance to prove its merits. If it be based on

Oxide of Zinc

it will be, and remain, beautiful, durable and economical.

FREE:
Our Practical Pamphlets:
"The Paint Question"
"Paints in Architecture"
"Specifications for Architects"
"Paint: How, Why and When"
"French Government Decrees"

The
New Jersey Zinc Co.
71 Broadway, New York

We do not grind zinc in oil. List of zinc white paint manufacturers will be furnished on request.

BOOKS ON THE ARCHITECTURE OF ALL COUNTRIES : : :

Bruno Hessling Co., Ltd.
PUBLISHERS and IMPORTERS

WRITE FOR CATALOGUE

64 East 12th St. New York, N. Y.

"The Sphinx of the Twentieth Century."

Asia and The Chinese Empire

Comparatively few people are familiar with the Chinese Empire as it exists to-day. In view of the constantly growing Oriental commerce of the United States, every one should become familiar with the Chinese Empire. The

New York Central's

"Four-Track Series" No. 28 gives valuable statistics and information regarding the Flowery Kingdom, and contains a new and accurate map in colors.

A copy of No. 28, "A New Map of Asia and the Chinese Empire," sent free, postpaid, on receipt of five cents in stamps, by George H. Daniels, General Passenger Agent, New York Central Railroad, Grand Central Station, New York.

Successful Boilers
AND RADIATORS

ONE OF 36 STYLES

Our Catalogue, "The Boiler Magazine," sent on request, is the best ever

Kellogg=Mackay=Cameron Co.
CHICAGO
MINNEAPOLIS KANSAS CITY
SEATTLE, WASH.

French Lick and West Baden Springs
Adjoining Resorts in Indiana
On the MONON ROUTE

Wonderful curative waters for diseased conditions of the digestive organs; magnificent fireproof modern hotels; rest, recuperation and recreation. Two trains daily via Monon Route.

Round-Trip Excursion Rate From Chicago **$12.45**

Folders and facts free. Address
CHAS. H. ROCKWELL, Traffic Manager FRANK J. REED, G. P. A.
200 Custom House Place, Chicago.

THE DELTA LANDS OF THE SAN JOAQUIN RIVER

are as rich as any in Holland and under the sunshine of

CALIFORNIA

growth is simply amazing. They are attracting the attention of Eastern Experts, and are among the remarkable lands of the world. Descriptive pamphlets free of Agents of

SOUTHERN PACIFIC

Send 10 cents for March SUNSET MAGAZINE, containing illustrated description of the Delta lands

Also books about opportunities and advantages of Life in California

WRITE
W. G. NEIMYER, General Agent,
193 Clark Street CHICAGO, ILL.

HOPPIN & KOEN, ARCHITECTS, NEW YORK

Cabot's Shingle Stains ..

MADE OF THE BEST PIGMENTS, PURE LINSEED OIL AND CREOSOTE, THE BEST WOOD PRESERVATIVE KNOWN

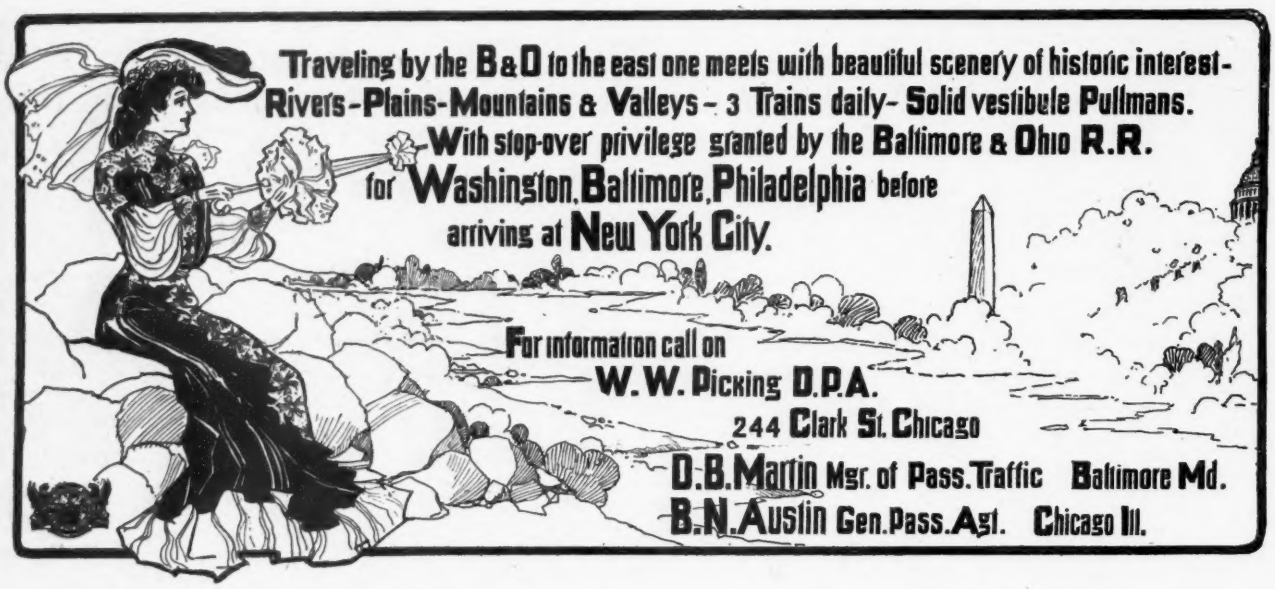
The Standard Stains for over twenty years

Samples sent on request

Samuel Cabot

Sole Manufacturer

28 Dearborn Avenue, CHICAGO — Oliver Bldg., 141 Milk St., BOSTON


Traveling by the B&O to the east one meets with beautiful scenery of historic interest-
Rivers-Plains-Mountains & Valleys- 3 Trains daily- Solid vestibule Pullmans.
With stop-over privilege granted by the Baltimore & Ohio R.R.
for Washington, Baltimore, Philadelphia before
arriving at New York City.
For information call on
W. W. Picking D.P.A.
244 Clark St. Chicago
D.B. Martin Mgr. of Pass. Traffic Baltimore Md.
B.N. Austin Gen. Pass. Agt. Chicago Ill.

KEASBEY & MATTISON COMPANY'S

"CENTURY" SHINGLES

FOR FIREPROOFING WOODEN BUILDINGS.

With ordinary care these shingles will last a century, without painting or any other treatment whatever. They are the cheapest shingles for every-day use.

ABSOLUTELY FIREPROOF.

LAST FOREVER.

Manufactured by

THE KEASBEY & MATTISON CO.

AMBLER, PA.

Standard size, 14 x 16 in., or any size to order. Our "Century" Sheathing for general fireproofing use can be had in large sizes.

Address all correspondence to

THE KEASBEY & MATTISON CO., AMBLER, PA.

DRAWING INSTRUMENTS

A. H. ABBOTT & CO.

Drawing Supplies,

Instruments, Tracing Cloth, Papers, Colors
Scales, Levels, Transits, Etc.

BLUE-PRINTS.

50 Madison Street, CHICAGO.

The Roebling System of Fire-Proof Construction.

HIGHEST EFFICIENCY IN THE FIRE AND WATER TESTS OF THE NEW YORK BUILDING DEPARTMENT, AND NOW THE RECOGNIZED STANDARD OF FIRE-PROOF CONSTRUCTION.

THE ROEBLING CONSTRUCTION CO.,

121 Liberty Street, NEW YORK CITY. — *171 Lake Street, CHICAGO, ILL*

SEND FOR CATALOGUE.

Please mention THE INLAND ARCHITECT when corresponding with Advertisers.

THE INLAND ARCHITECT AND NEWS RECORD

VOL. XLIV. NOVEMBER, 1904 No. 4

THE INLAND ARCHITECT AND NEWS RECORD

A Monthly Journal Devoted to

ARCHITECTURE,

CONSTRUCTION, DECORATION AND FURNISHING

IN THE WEST

PUBLISHED BY PORTER, TAYLOR & CO.

PONTIAC BUILDING, CHICAGO, ILL.

Entered at Chicago, Ill., Postoffice as second-class matter.

L. MULLER, Manager

SPECIAL CONTRIBUTORS:

C. Howard Walker, Thomas Hawkes, Louis H. Sullivan, William S. MacHarg, D. H. Burnham, P. B. Wight, Allen B. Pond, C. E. Illsley, W. L. B. Jenney, Irving K. Pond, J. R. Willett, F. W. Fitzpatrick.

TERMS: Regular number, $5 a year; Photogravure edition, $10 a year. Single copies, Regular number, 50c.; Photogravure edition (including 7 photogravures), $1. Advance payment required.

The columns and illustration pages of THE INLAND ARCHITECT are open to all alike, merit and availability only determining what shall be published. Contributions appropriate to its pages are always desired.

AMERICAN INSTITUTE OF ARCHITECTS

OFFICERS FOR 1904:

PRESIDENT	*W. S. EAMES, St. Louis, Mo.
FIRST VICE-PRESIDENT	F. M. DAY, Philadelphia, Pa.
SECOND VICE-PRESIDENT	WM. A. BORING, New York.
SECRETARY AND TREASURER	*GLENN BROWN, Washington, D. C.
AUDITOR FOR TWO YEARS	JOS. C. HORNBLOWER, Washington, D. C.
AUDITOR FOR ONE YEAR	JAMES G. HILL, Washington, D. C.

*Executive Committee.

BOARD OF DIRECTORS FOR 1904.

For Three Years.—Charles F. McKim, New York; Geo. B. Post, New York; R. D. Andrews, Boston, Mass.

For Two Years.—Robert S. Peabody, Boston, Mass.; W. B. Mundie, Chicago; Isaac E. Ditmars, New York.

For One Year.—Walter Cook, New York; Cass Gilbert, New York; W. S. Eames, St. Louis, Mo.

THE ARCHITECTURAL LEAGUE OF AMERICA

(ORGANIZED 1890.)

The Architectural League of New York.
The T Square Club, Philadelphia.
The Cleveland Architectural Club.
The Toronto Architectural Club.
The Pittsburg Architectural Club.
The Cincinnati Chapter A. I. A.
The Brooklyn Chapter A. I. A.
The Chicago Architectural Club.
The Detroit Architectural Club.
The St. Louis Architectural Club.
The Washington Architectural Club.
The Architects' Club, U. of Ill.
The Toledo Architectural Club.
The National Sculpture Society.
The National Society of Mural Painters.

EXECUTIVE COMMITTEE, 1620 Chemical Building, St. Louis.

William B. Ittner, President.
Newton A. Wells, Vice-President.
Ernest C. Klipstein, Treasurer.
Ernest John Russell, Corresponding Secretary.
Geo. F. A. Brueggeman, Recording Secretary.
Oscar Enders.
Ernest Helfensteller, Jr.

STANDING COMMITTEES.

Publicity and Promotion.—N. Max Dunning, Chairman, Chicago; Herman Kregalius, Cleveland; Claude Fayette Bragdon, Rochester.

Code of Ethics and Competition.—Julius F. Harder, Chairman, New York; S. C. Gladwin, Cleveland; Edward G. Garden, St. Louis.

Committee on Exhibition Circuit and Foreign Exhibit.—Newton A. Wells, Chairman, Urbana, Ill.; J. T. Vawter, Urbana, Ill.; Birch Burdette Long, New York city.

Committee on Currrent Work.—William C. Hays, Chairman; Philadelphia; Birch Burdette Long, New York city; Hugh M. G. Garden, Chicago.

Committee on Education.—Percy Ash, Chairman, Washington; Frederick M. Mann, St. Louis; John T. Comes, Pittsburg.

Ownership of Drawings

While it is the recognized practice of the profession to regard drawings as "instruments of service," and to stoutly maintain the principle that they are the property of the architect and should remain in his possession after the completion of the building for which they were prepared, there are doubtless many cases where the architect waives his right of possession upon demand of his client, which concession when made is usually to avoid friction and possible court proceedings. In thus relinquishing his right to drawings the architect, while he may secure present peace of mind, is fostering a condition that is liable to cause future trouble by establishing a precedent that may be turned against him should he desire to contest in an important case the question of ownership in law. In this view it would be to his individual interest, and a decided help in maintaining the established practice of the profession, should the architect always insist upon possession of his drawings. In England an architect was recently ordered by the Court to give up his drawings and specifications to his client in accordance with a previous law decision which the judges there regard as deciding the ownership at law of drawings. So well established is this precedent in English law that in the case referred to the judge would not even hear the evidence as to professional custom of architects called as witnesses but arbitrarily decided against the claims of the architect, notwithstanding the fact that in the precedent case the drawings were not carried out while the latter decision applied to drawings from which a building was actually erected. There might be possibly a shadow of justice that drawings if not built from should go to the client if paid for, but surely where used in building they should always be held by the architect.

What is Architecture?

It is difficult for the legal profession to appreciate that architecture does not consist in making drawings but in planning and erecting buildings with such architectural expression as the subject requires, and that the architect's drawings are simply his tools with which to attain this object. While in most cases full drawings are deemed essential they have been largely dispensed with in isolated cases on important work where rough sketches have answered. It is the building and not the drawing that is architecture, and having carried out the building the architect is entitled to his tools. We hear nothing of a sculptor's being asked to give up his preliminary studies in clay on completion of his statue. We look forward to the time when an architect's right to his drawings will be so well established that without special provision to that effect no one will question his ownership under all conditions.

VENTILATION*

THE invitation which I received from the Architectural Association to address its members on the subject of "Ventilation" was accepted as a compliment and with somewhat of a light heart; but more recently I have been reminded by Mr. (now Sir) Aston Webb, R. A., that, like politics and religion, the subject of ventilation is apt to arouse passion and prejudice. This fact has recently been unpleasantly forced upon me to such an extent that I have had seriously to consider whether I could venture to face another audience and run the risk of exciting animosity in again dealing publicly with the subject.

To have withdrawn, however, might lead to the suggestion that I had not the courage of my convictions, or at least that I feared consideration and kindness might be accorded to me by the members of this Association. Believing that truth and justice will eventually triumph in this as in other matters, and trusting in the good nature and reasonable spirit in which you will receive the few remarks which I have to make on this thorny subject I have decided to brave the occasion, simply premising that it will be my endeavor, not so much to raise controversy as to stimulate observation, in the hope of extending sound views upon the principles involved and greater intelligence in their application.

Difficulties which confront one in dealing with the subject of ventilation arise from the fact that it principally relates to functions of life which, in their fullness, are practically beyond human comprehension, and because it has to deal with individual susceptibilities as well as with an invisible, elusive and almost intangible body, viz., the atmosphere, affected by chemical and physical laws, but yet only partially understood. Literature on ventilation is somewhat profuse, and many eminent scientists have investigated various phases of the subject, yet it appears to me there is still an opening for a concise treatise which will deal with it in a scientifically practical and up-to-date manner, without prejudice, to serve as a text-book for architectural students. Under limitations imposed upon me by the editor, I wrote an article some three or four years past which appeared in a publication called "Modern House Construction," which, in some respects, deals with details it would be tedious to repeat in any evening's paper, although in substance I must place before you the same conclusions as those dealt with in that article and drawn from my own practical experience.

Perhaps the most unfortunate circumstance in connection with ventilation results from the fact that eminent early writers thereon, whose works are still largely resorted to, make assertions from their undoubtedly careful observations which, in face of more modern practice and the great improvements which have since been effected in appliances, cannot now be accepted.

One of the best standard works is that by Dr. D. B. Reid, who for some years supervised the ventilation of the Houses of Parliament. He published in 1844 a book entitled "Illustrations of Ventilation." His observations and general statements are fairly trustworthy, but his deductions are sometimes at fault.

A more modern book is that of Dr. J. S. Billings, of the Johns Hopkins Hospital fame, entitled "Ventilation and Heating," consisting of some 500 pages. It brings together a vast mass of useful information on the subject; but being written by an American principally for use in America, a considerable portion of its contents is unsuitable for this country, and a careful perusal of the volume left on my mind a sense of indefiniteness, examples being given of so many different methods without clearly indicating those that are worthy of adoption or those that should be avoided. There are numerous other writers on different phases of the subject, but the two mentioned are, so far as I know, the only books in English which deal with it exhaustively. Yet there is in both a lack of that practical guidance based on modern experience such as architects now require. The result has been to engender what I may term a chaotic state of mind in the profession. Some are inclined to dogmatize upon the simplicity of this or that method, while others prefer to do nothing, on the excuse that the difficulties are too abstruse. Nevertheless there are certain well-recognized facts which ought to be known by all, and intelligently made use of by those who realize the necessity for efficient ventilation or whose province it is to provide for it in our buildings.

It would be impossible for me in the course of an evening to go fully into what is known of the chemical and physical properties of the air we breathe. I must take it for granted that you are acquainted with its accepted composition and general characteristics. We all recognize our dependence upon the continuous breathing of atmospheric air to sustain life; but is it always realized that to sustain healthy life air must not only be breathed in sufficient quantity, but that it must be of suitable quality?

Under ordinary conditions nearly everyone who can use the muscles of his body for filling his lungs may get quantity, but it is not always obtainable in suitable condition or state of purity. "Give us some air" is an expression often made use of even by people fully surrounded by air. What they really want is fresher or purer air. Ventilation, therefore, must deal with both quantity and quality, or it cannot be considered effective.

The science of ventilation may be said to consist in providing and employing means by which adequate quantity can be procured and the art of ventilation as that of securing a wholesome atmosphere for the purpose. Unless air is reasonably pure outside a building it is scarcely possible to have it pure within. Air may be screened and washed, but it is questionable if any means have yet been devised by which, in its passage from without to within a building, a thoroughly impure atmosphere can be made wholesome.

It is rather beyond the province of architects to practically deal with the outer atmosphere. The question of maintaining it in a reasonable state of purity is of necessity a communal matter, and must be attended to by the State and by local authorities; yet each individual is personally responsible to the community for every act of commission or omission which leads to contamination of the atmosphere. So much depends upon the condition of the outer air whether or no good ventilation can be secured within buildings, that it is right we should direct public attention to the fact that no means supplied by architects for securing ventilation within buildings can be effective unless the outer atmosphere is maintained reasonably pure and wholesome. Millions are spent in order to secure supplies of fresh, wholesome water, because people recognize that an impure supply results in ill-health, disease, and death. But probably in consequence of the subtle nature and obscure effects of the atmosphere which all of us constantly breathe, expenditure is ever grudged in obtaining it pure and wholesome even within our dwellings.

It is this subtle nature of the atmosphere which doubtless accounts for the difficulties most people find in dealing with it. They cannot see, and only with difficulty handle it. Yet, as Sir Wm. Preece when young is said to have been told by his father: "The air, although you cannot see it, is as material as water; you feel it in every puff of wind, and see it in every bending bough." I am convinced by experience that the possibilities of dealing with it for the purpose of securing ventilation are greatly facilitated by fully recognizing the material nature of the atmosphere.

Air and water have different properties, yet in many respects they behave in a similar manner, and I believe the more thoroughly you study the latter and picture to yourself the material nature of the former, the better able you will be to make provision for adequate circulation of air in your buildings. Air is more universally distributed around the earth than is water, and, fortunately for us, it is in the open, naturally maintained in a fairly uniform condition; many influences being continuously at work to keep it in a sufficiently pure state for supporting human existence. Yet, even apart from human agency, it becomes fouled. In certain localities the atmosphere is well known to be unhealthy, and although it may appear heretical to say so, in these days when the open-air treatment is so greatly extolled, there is reason for believing that better health and comfort can at times be secured within doors than outside—or why should buildings be erected? Partly, no doubt, to shield ourselves from excessive velocity of winds, which may give us a pure atmosphere, but then the over-rapid movement of air is liable to so reduce the heat of our bodies when at rest that ill-health may result.

An important difference between air and water that while air is very elastic and can be compressed, water cannot be reduced materially in bulk by compression. It is now demonstrated that air can be brought to a liquid and even solid condition, and we know that water can easily be frozen solid or volatilized. I mention these facts in the hope of impressing upon you the material nature of the atmosphere, that it can be handled and dealt with, that it is subject to certain laws which can be ascertained, it can be measured and weighed. Like water, it dissolves certain substances and vapors. It will hold in suspense insoluble matter. Frech air, like fresh water, may become fouled by contact with impurity, either in the open, in confined vessels, or by passing through dirty conduits.

If desiring a "drink of water" you find it unpalatable, it would be folly to continue taking it from the same source in the expectation of getting a refreshing draught; or if you know of a pure source of supply, you would not willingly permit it to be conveyed in a dirty vessel or through a foul channel. Similarly you cannot expect to have fresh air unless it be taken from a pure source, and having a pure source around a building care should naturally be exercised so that it be not contaminated by contact with impurity, whilst entering or when within a building, before being breathed by occupants.

Architects being principally concerned in the design of buildings which, on being erected, cause obstruction to the free circulation of air, it is only reasonable that upon them should devolve the necessity for providing efficient means whereby adequate change of air can be secured within and around the buildings they design and erect, so that stagnation may not take place to the injury of those who occupy them, or to the detriment of surrounding properties.

Movement above all things is necessary for maintaining a healthy atmospheric condition. Consequently, the first consideration in respect to securing ventilation within a building is—how can the required movement be brought about? Probably the earliest buildings were erected in order to secure protection from excessive movement of the atmosphere. Our term "house" signifies a covering or protection. At an early period the necessity for securing ventilation must have been recognized, because

* *A paper by Mr. Henman read before the Architectural Association.

in the simplest dwellings an eye or opening for the wind, now termed a window, was provided; and as there must also have been a second opening for the ingress and egress of individuals, means were provided by which movement of air within could take place. When it is understood that air is a material body it becomes evident that, before a fresh supply can enter, an equal volume must make way for it. Consequently an outlet as well as an inlet becomes essential, and at the present day buildings are mostly provided with both windows and doors, but, unfortunately, they are not so generally made use of for assisting ventilation as they might be, although by their reasonable regulation, according to the varying state of the outer atmosphere, it becomes possible, by the exercise of a little personal attention, to adjust matters. Except the property of diffusion, which is common to all gases, air has no inherent power of movement, but movement being essential for maintaining its freshness and for securing efficient ventilation, some power must be brought to bear upon it. The most potent natural power available is wind; yet wind is only the result of varying temperature on large bodies of the atmosphere. When heated, air becomes specifically lighter than an equal volume of cooler air; the latter falling by the power of gravitation, forces up the warmer, and therefore lighter air around; consequently it is the power of gravitation which principally causes natural movements of the atmosphere, *i. e.*, winds. Let me specially direct your attention to this, because I believe considerable misapprehension, in respect to possibilities of securing ventilation, has resulted from a somewhat slipshod manner in dealing with this scientific fact; for it is most commonly stated that heat causes air to rise, and that statement of the case has led many to infer that heat causes a suctional influence in a flue. By adequately appreciating the fact that no power is known which largely attracts air upwards, while we are well acquainted with the power of gravitation which attracts it downwards, you may realize that when a fire is lighted at the base of a flue it causes a body of air to expand, which then being lighter than the air around, the latter is attracted downwards by gravitation and forces the warmer and lighter air to ascend. Such being the case, it is by propulsion and not by suction that the air of the room is changed when a fire is lighted at the base of a flue.

So much importance do I attach to a clear understanding on this point that I ask you to test the correctness of it yourselves; place two large thin glass vessels in a delicate balance, let each be filled with air of equal temperature so as to secure an even balance, now heat the air in one of the vessels, permitting the excess to escape as it expands, and it will be found that the arm of the balance which carries the lighter air will rise—not because it is attracted upwards by the lighter air, but because the heavier air on the other arm of the balance is attracted downwards by gravitation.

People of some scientific attainments with whom I have discussed this question were inclined to treat it rather as a distinction without a difference, and asserted that where there is a push there must be a corresponding pull, and *vice-versa*. Theoretically that may be, but practically it has certain limitations. You can pull with some effect by means of a rope, yet with it very little power of push can be exerted; with other substances—with fluids and even more so with gases—considerable force of propulsion may be exercised, but very little "pull."

If you suck or draw air out of an enclosed space around which are various apertures, you will find that the incoming air will take the line of least resistance towards that outlet. Suppose the enclosed space to be a large room, with windows or other openings around, some high up, others low down; if a suctional influence be brought to bear upon the interior, say by an extraction fan near the upper portion of the room, the greatest volume of air will come in by the openings nearest to the fan, and but little change will be effected in the lower portion of the room. Close all the openings high up, and the air will travel from greater distances, consequently better change of air within the room will be effected; but if people at the floor level are to benefit by that change they also run the risk of experiencing discomfort from draughts, because when a suctional power is made use of it is difficult to determine where the incoming air will enter, and some may be sucked in directly from the outside, and will certainly cause discomfort in cold weather. The effect is the same whether mechanical power or the natural force of wind be employed. So I think it fortunate that Nature has provided forces which act more strongly in propelling than in extracting air from dwellings.

Other terms used in connection with our subject have been unforunate from a scientific point of view, such as "Automatic Ventilation," "Natural Ventilation," and "Mechanical Ventilation," because ventilation is a result brought about principally by the exercise of an ascertainable power. It can never be properly described as "Automatic," "Natural," or "Mechanical." It may, however, be brought about by natural or by mechanical means, and there is, correctly speaking, no such thing or appliance as a ventilator unless there be also power acting in conjunction therewith. It is the power which causes change of air.

To my mind this should be most comforting to architects, because, as natural power must most frequently be relied on for securing ventilation, all that they can do in such cases is to provide suitable *means* in and about their buildings; for it rests with occupiers to maintain, regulate, and properly employ the means which every architect ought to suitably provide for ventilating his buildings.

In this country, at least, the warming of our buildings is necessary for several months in every year, during which times it is practically impossible to effect ventilation without considering the subject of warming in conjunction therewith.

Whether the lighting of a fire results in the development of a natural, artificial, or mechanical power, is not very material, the important fact is that it does develop a power, and an open fire is most useful, not only because it gives comfort by the heat it evolves, but because the power developed may be usefully employed to assist in securing ventilation.

Those of you who have followed up the subject, know what controversy there has been on the question of upward and downward ventilation. All will probably agree in condemning actual down draught, and I shall not attempt to defend that; but, what is draught? Why, simply an excessive movement of the air which causes discomfort. It has been ascertained that at a velocity of 4 ft. a second most people would complain of draught, some might at 3 ft., few would at 2 ft., and not even the most sensitive person is likely to complain of draught when the velocity does not exceed 1 ft. per second. The temperature of the air will naturally have some effect, so it must be assumed to be normal, *i. e.*, about 60° Fah.

Efficient ventilation of occupied apartments implies the continuous change of air without causing discomfort to or adversely affecting the health of occupants, and after several years' observation I cannot detect the least objection to that change being effected in a downward direction, so long as draughts are avoided.

Because air respired and emanating from our bodies is warm, and being warm it is light and will therefore rise, is the argument used by the advocates of what they call upward ventilation, and they term it Nature's method. But, again, I believe this to be the result of an imperfect appreciation of scientific facts.

In the act of respiring, air is expelled with considerable force from the mouth and nostrils, largely in a downward direction, by the contraction of the lungs, and the expired air being warm and light, is, at some distance from where it was emitted, *forced* upwards by cooler and fresher air coming down from above, for the benefit of the individual. Consequently, if our ventilating appliances are so arranged as to secure a constant supply of fresh air above the heads of individuals, and to carry off the expired air at a low level, is it not probable that, as occupants more generally occupy the lower portions of a room than the upper part, they are likely to obtain fresher air from the larger volume above their heads than from that below?

Take an extreme case, such as a compact body of people in an assembly hall—is it not evident that they can be supplied with fresh air better from above than from below, for in the former case the air above is far greater in volume, can circulate freely, and is likely to be more pure than the smaller volume below their heads, which can only move about with difficulty, and must be contaminated by emanations from so many people being congregated together? To ventilate efficiently such a crowded room from below is practically impossible, because even if fresh air be supplied from below, it must become contaminated by passing over the bodies of a number of people before being breathed, but it has been proved to be quite possible to do so from above.

If under such adverse circumstances ventilation can best be secured by downward movement of the atmosphere, surely it can be attained under more favorable conditions for smaller numbers. In an ordinary room, with an open fireplace, where do we find the outlet opening? Why, within 2 ft. to 3 ft. of the floor level. Every one can prove for himself that, unless some greater power be exerted, such as a strong gust of wind, or a much larger fire in the same or an adjoining room, etc., which will only occasionally occur, the sole outlet for air is by the fireplace flue. If any present are not thoroughly convinced of this fact, I beg they will test it for themselves. A lighted match or a piece of thin paper held before every possible opening is all that is necessary, and I venture to say that under normal conditions they will easily detect that air is entering at every other opening and only quitting the room by the fireplace flue. Bearing in mind, then, that efficient ventilation implies comfort for the occupants of a room, the next question is—Where should any special inlet for air be placed? I say "special inlet" because if air quits the room by the fireplace flue, other air must enter some way or other to replace it; generally you will find it comes in through casual cracks and crevices around the lower portion of the room, and travels in narrow streams direct to the fire, frequently resulting in unpleasant draughts, and the more thoroughly cracks and crevices are closed the more likely will discomfort be experienced from draughts. On that point I shall have something to say later on. At present we are considering an ordinary room, built in the ordinary manner. And although it may appear paradoxical, the best way to prevent draughts is really to admit air more freely. It may involve rather more expenditure of fuel for maintaining comfortable warmth, but that is better than catching colds. If, however, change of air is too rapid in any room, the only way to prevent it is to reduce the outflow by contracting the sectional area of the outlet flue, because it is the cooler air pressing in on all sides which forces the air of the room up by that flue. And, as with the same pressure only a given quantity of air can be forced through a flue of given section, reduce that section in size and a less volume of air will be passed through it in a given time under similar conditions. Consequently the velocity with which the air will travel from inlet to outlet becomes lessened, and draughts in the room may be overcome; but, then, the question will arise—

Is the room being efficiently ventilated? If not, then the outlet flue area must again be enlarged, and a special inlet provided. So we come back to the question—Where shall it be placed? After careful observation and experiment, extending over several years past, I say, without hesitation, that it should be on the same side as the fireplace opening, as nearly central thereto as may be, and towards the upper portion of the room say, about 2 ft. below the ceiling). By providing louvres or other means for distributing the incoming air throughout the upper portion of the room, it will mix with the warmer air rising in front of the fire, spread out, gradually fall and make its way towards the fireplace flue, without causing discomfort, because its velocity will be slight, and, coming in contact with the warmed surfaces in the room, its temperature will be raised, while if the fresh air enters freely at the special inlet, less air will enter by the casual cracks and crevices. With inlet openings in any other position there will be less diffusion throughout the room, because incoming air will take a shorter and more direct line towards the fire and leave portions of the room less perfectly ventilated. If the arrangement I suggest is right, then downward ventilation with comfort is secured.

Another subject in connection with ventilation to which I have devoted attention is that of condensation and evaporation. I do not think these results, brought about continuously by variations in temperature and movements of air, have received the consideration which they deserve, for they exercise very decided influences in connection with ventilation. As the temperature of air is raised it becomes more and more capable of absorbing moisture, and is specifically lighter than dry air at the same temperature. Again, as it cools by coming in contact with cooler surfaces, moisture is deposited, and, becoming specifically heavy, the air falls. Vitiated air may for a time be somewhat purified by condensation, but the impurities are deposited upon the cold surfaces with which it comes in contact, and unless those surfaces are frequently cleansed, the animal matter deposited with the moisture in time putrifies, with the result that rooms become stuffy where such condensation takes place and is not soon removed. You may open the windows freely and freshen up the atmosphere for a time, but when again closed up the stuffiness again becomes apparent, particularly if a fire be lighted, because heat assists in volatizing the impurities. For this reason I hold the opinion that the most healthy rooms to live in are those of which the walls are not constructed of dense materials which do not retain heat. In fact, I believe that rooms, the walls of which are constructed of pervious materials, are likely to be the best ventilated, even when no special inlets for air are provided. Such walls take up and retain heat from the fire, they allow air to pass through them over their whole surface, the air is filtered and takes up heat in its passage through, it enters gradually yet in large volume, and keeps up a thorough change of atmosphere in the room without perceptible draughts.

Some think that the continual passage of air through the walls will in time contaminate them, but with reasonably pure air outside and exercising its known purifying effect, it is more than likely that no deleterious effect upon it would take place, provided always that the walls are kept dry. Wet in the walls would partially close the pores, and probably cause vegetable and, maybe, animal growth. Unless ample provision be made for permitting continuous change of air in a room, nothing can be worse than constructing all walls, floors, and ceilings of impervious materials, or than the covering of all surfaces with impervious materials—such as linoleum, lincrusta, paint, etc.

Movement of air outside—in a word, wind—is the active force by which ventilation within doors is principally brought about; consequently, when rooms are unoccupied windows and doors should be freely opened, so that frequent change of air may take place. Surfaces and materials on which deleterious matters have been deposited or by which they have been absorbed, may then become purified, in addition to which, the frequent cleansing of surfaces and materials is necessary if a pure atmosphere within doors is to be maintained. Some places, even with air constantly changing, are never sweet and wholesome. Urinals and the household water closets, unless all surfaces are kept scrupulously clean, are unwholesome places which may contaminate the atmosphere of a house. Many of these appliances are still badly constructed, particularly in public places. Generally speaking, at railway stations they are a disgrace. The large surfaces contaminated and infrequently cleansed constantly generate noxious fumes which foul the air, change it never so frequently. Public urinals are capable of great improvement; there should be no angles in which deposit can accumulate, open channel ways should be abolished, each separate urinal should be trapped and provided with a frequent flush of water so directed as to cleanse all surfaces which can be fouled. Properly constructed and maintained, little contamination of the atmosphere will take place in and around them. I draw attention to these necessary appliances as being illustrative of our subject, and to impress upon you that mere change of air is not all that is required to secure good ventilation; cleanliness and the continuous removal of everything which defiles the atmosphere is quite as essential, particularly in and about the channels or ducts which convey air from without to within the building.

Let us summarize the points to which reference has already been made:

1. The deductions of early writers or of those who simply adopt their views should not be accepted without personal examination as to their correctness.

2. Ventilation is an effect always brought about by the exercise of an ascertainable power; it is never automatic, and no appliance without the employment of power is, properly speaking, a "ventilator," but simply a means by which ventilation may be secured when a power acts to cause movement of the asmosphere.

3. Air to be serviceable for ventilation must be kept free from defilement.

4. To secure change of air within doors, both inlets and outlets are essential.

5. Warm air rises, because it is forced upwards by cooler air, the latter being attracted downwards by gravitation.

6. Nature's principal method for causing movement of air is propulsion.

7. By taking precautions to reduce velocity and so to prevent unpleasant draughts, the downward movement of air may reasonably be employed for securing ventilation.

8. To secure fresh, wholesome air for the purpose of ventilation within doors, condensation on surfaces should be guarded again, and all surfaces, as well as the substance of materials, should be maintained in a clean condition.

In this country, as I have previously mentioned, it is necessary to employ heat during some four or five months of the year for the sake of comfort within doors, and the open fire has been referred to as a means for assisting ventilation, because it necessitates a flue by which the products of combustion may be carried away. Such flues, even when no fire is alight, generally act as outlets and so assist in the ventilation of an apartment. To close them by a register or any other means is, therefore, an improper proceeding and should on no accouint be resorted to. Other forms of heating—say by steam or hot water pipes or by electricity—do not on their own account necessitate separate flues from the apartments heated, but it is quite as essential that outlets—as well as inlets—should be provided if change of air is to take place in apartments so heated.

Judging from the various schemes for ventilating buildings which have come under my notice, I am surprised to find what little attention is given to even the most elementary calculations as to the probable results which will be attained notwithstanding that certain data have been arrived at which experience proves to be fairly reliable, and so simple that there is no excuse for neglecting to employ them. Failure, where it takes place, results generally from underestimating the supply of air necessary for securing efficient ventilation, and from the employment of restricted areas of inlet or outlet channels, openings, or ducts.

An ordinary room is provided with one fireplace flue, and, as previously stated, when a fire is lighted, that flue is practically the only outlet for air from the room. Consequently, by ascertaining the velocity of air passing up the flue and the sectional area of the flue, it is easy to find how much air will pass through the room in a given time.

Several influences will be at work at varying times which will affect the velocity of air passing up the flue, such as more or less fire in a grate, more or less force of wind outside, larger or smaller inlet openings, etc., but under medium conditions a flow of about 5 cubic ft. per second may be taken as the average volume passing up an ordinary 14-in. by 10-in. flue. Kindly note that I give the volume at about 5 *cubic ft.* I do this for the purpose of simplicity, and because it is near enough for practical purposes and can easily be remembered. If 5 ft. be multiplied by 60 times 60, the number of seconds in an hour, the result—viz., 18,000 ft.—will be the volume of air passing through the room at that time, and if change of air be demanded at the rate of six times per hour, the cubical capacity of a room with only one fireplace flue should not exceed 3,000 ft., say 20 ft. by 15 ft. by 10 ft.

A point which requires consideration is the size of a special inlet relative to that of an ordinary fireplace flue. A good rule is to have it of ample dimensions with easy means for its regulation. It is then the fault of the occupants if care be not taken to adjust it to requirements. The difficulty, however, is that people are genally careless in paying attention to so simple an appliance—on a windy day the opening will be closed to prevent discomfore from draughts, and no one thinks of opening it in calmer same side as the fireplace and as nearly central thereto as possiweather; therefore, when the inlet is placed as I advise—on the ble, about 2 ft. below the ceiling—a clear opening of about one-half the area of the outlet flue will suffice, for the following reasons:

1. If the inlet is simply through an external wall there will be less friction than in the long outlet flue, therefore the velocity can be greater.

2. Because with a properly-formed and louvred inlet the additional velocity in the upper and unoccupied portion of the room will distribute the air throughout better than if entering at low velocity.

3. Because variations in the force of wind outside will not be so much noticed within the room when the area of inlet-opening is not excessive.

But because of the well-known and frequent variations in the force of wind outside I have devised this little automatic regulator. You will notice that in calm weather the central flap will stand stationary allowing some 2½ in. of space for the air to pass in, but as the force of wind increases the flap will be deflected and the available space is thereby reduced proportionately. A difficulty which took some time to overcome was, so to

hang the flap that its movements could take place without producing a clicking noise; after several attempts I believe this has been successfully accomplished, consequently the appliances may be usefully employed to avoid the necessity for any personal regulation, and I believe it should go a long way towards solving one of the difficulties hitherto experienced in securing constant and adequate ventilation without personal attention. Only one size is made, suitable for a room with a single ordinary flue, two or more of the automatic inlet regulators being necessary for larger rooms. Attempts have previously been made in the same direction, but the difficulty of overcoming the annoyance of clicking noises in appliances with movable parts has militated against their adoption. Having no pecuniary interest whatever in the appliance, I may safely commend this automatic inlet regulator to your favorable consideration.

Much more might be advanced as to the necessity for considering details in connection with the employment of natural means for securing efficient ventilation, not only in domestic buildings but also in those for more public purposes. Let me again remind you that doors and windows can, and should, be more generally regarded as legitimate means for securing change of air within buildings. Windows should be constructed so that they may with ease be opened and closed, and that whenever practicable they should be freely opened, particularly at times when the buildings are unoccupied. Although the many appliances called ventilators, employed when open fires are not employed, only permit of the passage through them of a limited amount of air—for, as a rule they are too small in size, and are only serviceable when there is sufficient movement of the outer atmosphere—it fortunately happens that in this country some movement is taking place more frequently than not, and one advantage secured by the use of ventilating appliances is that a certain amount of change of air takes place through them almost continuously. For continuous occupation, however, the change of air which takes place when such appliances alone are depended upon, is generally inadequate—a few figures will easily prove this. Ascertain the cubical capacity of the building and the total minimum area of the free openings in the appliances, and find the time required for the volume of air contained in the building to pass through the openings, say at a velocity of 5 ft. per second, and unless the whole volume can pass through in twenty minutes, *i. e.*, at the rate of three changes per hour, efficient ventilation will not be secured for reasonable occupation of the buildings during any considerable length of time. In calculating the amount of change of air required in a building it is safer to take as a basis the cubical contents and number of changes per hour than to take the number of people to be accommodated and allow so many cubic feet of air in a given time for each, because it is important to remember that the building itself has to be ventilated as well as that the occupants require change of air.

For this reason I have come to the conclusion that, unless it is considered worth while continuously to ventilate buildings when mechanical means are provided, there is risk of failure, because when the mechanism is stopped change of air ceases, and although when the machinery is restarted changes of air may soon be effected, the long period of stagnation permits the materials of and in the building to cool down; condensation then takes place on all exposed surfaces and other influences deleterious to the atmosphere of the building may, for a considerable time, result.

For buildings such as hospitals which are continuously occupied and throughout which it is important that continuous and ample change of air should take place, together with uniform heating, I thoroughly believe that mechanical means will in time become an absolute necessity. Having recently dealt with this subject at the R. I. B. A., I will only now say that to successfully ventilate a building by mechanical means implies a considerable knowledge of the various appliances available—there must be no stinting of space or of materials necessary to secure the most thorough and economical results. A change of air up to ten times per hour must be insisted upon, the plant in all important features should be duplicated and the most economical power available should be employed. All air ducts and channels should be of ample sectional area so as to reduce friction to a minimum and so that they may be readily cleansed; both inlets and outlets must be arranged with judgment and properly proportioned. The air must be taken in at a point most free from contaminating influences, it must be screened, brought to a suitable temperature, and hygrometric condition, and passed on to the several apartments required to be ventilated, without the possibility of its becoming deteriorated until it approaches the outlets and is again discharged into the open, through properly constructed outlets so that movements of the outer atmosphere may not exercise any influence upon its outflow.

For some time there was considerable controversy as to whether methods of propulsion or of extraction were to be preferred. I believe that by far the majority of those who have had practical experience in the matter are now more favorable to propulsion. One of the most serious mistakes has been the combination of the two systems, for they cannot possibly be worked together economically, and I fear that even if expense were no object, imperfect results only can be attained by employing conjointly means for securing extraction as well as propulsion.

Experience of the practical working of well-proportioned installations of Plenum ventilation by mechanical means has proved to me that it is possible to secure continuously, and at a reasonable expenditure, efficient ventilation such as it quite out of the question when natural means alone are relied on. In saying this I on no account undervalue the necessity for taking advantage of the means which Nature places at our disposal, because I realize that for the majority of buildings anything in the way of mechanism for securing ventilation is out of the question at present, although I venture to predict that, as time goes on and the possibilities of employing mechanism for the purpose are more appreciated, an architect's training will not be considered complete unless he has made himself fully acquainted with the principles and appliances by which buildings may be successfuly ventilated by mechanical means.

Mr. Henman further said that his experience had been contrary to that contained in what were called the recognized works on ventilation. He found that nearly everyone writing on the subject went back to Dr. Reid, and although Dr. Reid made the most careful experiments with the apparatus he was able to obtain in his day, nevertheless in regard to many of the important statements and the deductions he made he was scientifically wrong, and it was for that reason that he (the speaker) had put before them the particulars he had. He hoped he had given his reasons sufficiently clearly, and that they would be able to see that Dr. Reid was wrong in the conclusions he arrived at. As to the question of keeping the air channels, ducts and flues clean, in any system of ventilation, mechanical or natural, it was a question of having the flues get-at-able; unless the flues were kept clean good ventilation could not be obtained. Flues should be so arranged that they could be swept, and "if they are arranged so that they can be swept, then sweep them." As to walls being pervious, and as to the amount of air that would come through, several experimentors had tried to ascertain this. It differed with every class of material and every surface put upon a wall, but it was surprising what an enormous amount of air came through the walls of an ordinary room. He had been in rooms where he had known that the bricks and materials were thoroughly pervious, and the air of these rooms had always been fairly sweet and clean. On the other hand, some thirty-five years ago he took an office on the walls of which was a thickly varnished grained paper, which, as he could not endure that sort of thing, he had painted a dark green. There was linoleum on the floor and the ceiling was painted, and so uncomfortable was the room that he had to give up the office for that reason. Air could enter only through cracks around the doors and windows, or by a special inlet over the door situated on the opposite side to the fireplace. It was one of the most uncomfortable rooms he had ever been in, stuffy without a fire and very draughty with one; and wherever you sat on a cold day you were in a draught, and you could not prevent it. The more you shut up the pores of a room, the more this would be so. Air would come in, and if it did not come through the materials it would come through cracks or windows and cause a draught in its passage across the room to the chimney. He had told them that air heated in a flue ascended because it was propelled upwards by the surrounding cooler air being attracted downwards by gravitation; the outer air was then pressing in all directions, seeking entrance to the room; if openings were few and of no great size, air would be forced in thin streams rapidly in direct lines to the fireplace, probably causing unpleasant draughts, and yet not efficiently ventilating the room. With larger openings more distributed, better results might follow, but with one or two properly constructed openings on the fireplace side about 2 ft. below the ceiling, the incoming air might be well distributed throughout the upper portion of the room, and would return towards the fire at low velocity from all parts much in the same way as it would if it came in through pervious walls, floor and ceiling.

MUNICIPAL IMPROVEMENTS*

WE are living in a wonderful age of building, when houses, streets, great towns, indeed, spring into being almost in the space of days. In London, large schemes are in hand, such as no previous generation has ever known, and which are changing the character of whole districts. The most conspicuous feature in this new architecture is its entire absence of uniformity or consideration of surroundings. Architects, with varying success, have given rein to their imaginations without allowing themselves to be controlled or influenced in any way by neighboring buildings; so that our streets present a want of character and scale which is singularly unsuitable in a city such as this. That this should be the case where many of the buildings individually are most admirable, is lamentable, and I cannot help thinking that it is a matter for regret that in this country we have no Ministry of Fine Arts, or some consultative committee on art who could advise when sites come into the market, or buildings are pulled down, as to the form the rebuilding should take, or what improvements or modifications in the design would conduce to the future dignity and beauty of the city.

It is, perhaps, too much to hope that the London County Council will control the capricious talents of architects and builders in Aldwych and Kingsway, but the greatest opportunity of recent years will be lost if such sites are allowed to be covered with individual erections—the creations of commercial syndicates, too

*Extracts from the address of President E. Guy Dawler, the Architectural Association.

varied in style and material to give any dignity or character to their environment. The recent changes in the Strand have proved that a great deal of the beauty of Saint Mary's came from the fact that the church was so well fitted in style and size to the position in which it was built, and to the height of the houses around it. I venture to think this essential principle is not sufficiently regarded in most of the new buildings we see on all sides. This feeling of inequality and lack of proportion is more noticeable in our street architecture than in anything else—there is no settled tradition in building; no definite aim or standard in view, and all treat different things in different ways, and the "loudest" and most garish edifice attracts the most attention. This, again, is emphasized in the treatment of our shops, where massive buildings, many stories high, rest with no visible means of support upon huge sheets of glass, while the facades of many others are covered and disfigured by enormous letters and advertisements. It is indeed strange that we should, as a nation with some claims to taste and refinement, tolerate these shams and eyesores that mar and spoil the finest streets of all our large cities and towns.

I cannot help thinking we have lost a good deal in the beauty and consistency of our street architecture since the days when such men as the brothers Adam, Chambers, Nash, and the Woods of Bath gave us their quiet facades and street fronts, all based on some definite idea and planned on a big scale, and though perhaps slightly uninteresting to us to-day, yet possessing dignity, scale and symmetry. In street architecture the mass should be the main idea and the individual building should be subsidiary to the general design, but exactly the opposite seems to be the prevalent idea to-day, and one cannot help looking forward with some degree of misgiving to the result of such experiments as we see in Regent street, which break the simple lines and grouping of what, however much its monotony may be abused, possesses some claims to design on a monumental scale.

Without doubt, all this variety, this diversity of idea and design which we see everywhere throughout the country, is attributable to our lack of architectural education in the past—we have not learned in any school, nor on any method, and hence our architecture, like our training, is individual and haphazard, everyone building what best suits his taste, just as our students study or pick up their ideas in a like manner. On the other hand, in essentially domestic architecture, this country stands pre-eminent. Our country houses possess a character and quality of which we may well be proud, and in this branch of our art a common sense and legitimate use of material is producing a style that stamps the building of to-day. In municipal architecture we have also vastly improved during the past decade, and many of our modern buildings are well worthy of comparison with the works of masters of bygone years.

But as a nation we have quite failed to recognize the importance to the community of well-thought-out schemes of building and their environment on a large scale. We lack in England that spirit of civic pride which is so pronounced abroad—a pride in the beautifying of our cities and towns that makes one vie with the other in a display of noble buildings, dignified squares, and that co-operation of architect, sculptor and painter which alone can produce great and noble works of art. The least observant cannot fail to be struck by the feebleness of conception shown in dealing with the various sites that come into the market. It is deplorable that they should be regarded merely as commercial speculations, to be covered with buildings with neither character or individuality, and without the least regard for their surroundings, and perhaps more than anywhere else this is seen in the development of our suburbs. On the Continent this problem is dealt with in a systematic way, and the various municipal authorities prepare the layout of the general scheme, the lines along which the extension is to take place and the proportion of the whole site which may be covered by buildings. It is a great pity that our English town councils do not study the admirable work of town extension now being done in Germany, and do not obtain Parliamentary powers to do similar work here; our towns might then be developed and improved on broad and dignified lines instead of the haphazard way we now deal with a question that is worth far more consideration than is given to it.

In this country the interests and rights of the individual are so jealously guarded that it is almost impossible to effect improvements, so that it is Utopian to hope for the wide avenues, open spaces, gardens and fountains, such as we see and admire in foreign cities. A longing for light and air, though unexpressed on the part of the public, is evident from the desire shown to live away from the overcrowded centers of our towns—to spend some few hours in the outskirts, where sufficient air space can be given to the houses, and where streets can be wide and open spaces provided. But unfortunately the country surroundings of our towns and cities are so rapidly becoming alike, so levelled down to one dull cosmopolitan stamp, that the people who live there forget, or never realize, that there are towns and cities which can boast of long antiquity and a noble history, and contain ancient and venerable buildings. They form as they grow up their impressions of architecture from that they live among and see on all sides, and if their surroundings are commonplace and mean, can it be wondered that by them architecture is regarded with indifference, and that beautiful buildings arouse no feelings of reverence and appreciation?

It was estimated in the *Times* recently that London suburbs were spreading and filling so fast that as many as nine hundred thousand people settled in them, in new homes, in ten years; and that to Greater London every year is added a city the size of Norwich! It is difficult to realize such a fact when we contemplate it seriously and think of the old cities of mediaeval days, crowded with beautiful buildings which cost long years, even centuries, of toil and thought, to create, when building was for all time and architecture a living force. To-day, when these communities grow like mushrooms, I feel that this is almost a national question, and, unless some steps are taken to plan our new towns and their surroundings on better and more artistic lines, that architecture, as an art, will very greatly suffer.

Experiments have been made in recent years in this country, of building and laying out towns and villages on some artistic basis, and with very satisfactory results. The paper that was read last session on the Bournville settlement, showed that these buildings could be erected to pay a fair return of interest for the outlay, and entirely disposed of the fallacy that to build artistically is more expensive than otherwise. There can be no doubt that the influence of communities such as these must eventually have a great effect on the taste of the public. But unless this question of the extension of London suburbs is dealt with on some such lines, we shall be surrounded by a belt of appalling monotony and ugliness, as every suburban extension makes the existing suburbs less desirable.

ARCHITECTURAL DESIGN.

Gentlemen, all these are broad questions, not unworthy of your careful consideration, and though they may appear to our younger members as dry and uninteresting, it is essential that they should be conversant with such matters, which in after years will force themselves on their attention. But do not believe that architecture has vanished as the pessimists say, for at least we are not satisfied with its substitute, and though houses and costumes perhaps fall short of mediaeval grace and color, yet both are tending to become more seemly and convenient than those our forefathers knew. Slowly, but surely, we are striving for, and I think arriving at, that combination of beauty and utility wherein lies the truest, perhaps the only true art, and we have to-day an ever-increasing body of able and thoughtful men, who are doing work that is worthy of our highest admiration, and which is awakening the interest of the public in an art which for years past has been regarded with comparative indifference. In architecture, decoration, and the plastic arts, there is a strong and virile movement permeating the country, not only to treat material sensibly, but with freedom from the fetters of bygone schools of design. It lies in your power to forward this movement, to train your hand and eye, to study and labor in the profession you have chosen, remembering always that as the coming generation of architects with you rests a great responsibility. I would have you think of architecture from a national standpoint as a great power, and make up your mind from the day you enter the profession to devote yourselves to the uplifting of the noblest of all the arts. Your work will be your greatest recompense, and if you throw your heart into it you will find it a never-ending pleasure and engrossing pursuit to the end.

Look at things largely and try to think in the mass, and do not design your buildings as separate elevations, but picture them in the round, as imaginary buildings, that you can feel and handle, and plan out the surroundings, and the environment, so that the whole is complete in every way. If you accustom yourselves to this habit of thinking of your designs as a whole, you will be surprised at the grasp of idea it will give you and the increased pleasure you will get out of your work. Study the work of our best living men whenever you have the opportunity, as well as those long since dead, and do not neglect the prosaic present for the picturesque past.

Whenever you see a beautiful building or work of art, either one just completed or an old one colored by the mellowing hand of time, one that instinctively impresses you by its sense of proportion and fitness, try and analyze it and find out what it is in its conception and construction that produces this effect. The cultivation of this habit of analyzing everything you see, of dealing with actual existent facts, will help you to design and plan far more than studying books and illustrations.

The reason we admire old work so much is, I think, partly sentimental and partly because it is, as a rule, thoughtful and honest—there is a feeling of reposefulness, of satisfaction and charm that so much modern work misses, and it is this spirit, this intangible something that one feels but cannot express in words, that you should strive to attain and which will give character and beauty to your work. It is the spirit and the thought behind the design that makes a beautiful building, and the more thought you put into your work the better and nobler will it be.

SKETCHING AND MEASURING.

So much is being done nowadays to encourage practical training and technical education that many are apt to neglect the more artistic side of their work. The recent Exhibition of holiday sketches and drawings, at the Royal Institute of British Architects was quite a revelation, and showed that architects in daily practice can yet produce most clever and artistic drawings and sketches. By some of our younger men, sketching and measuring, I understand, is not nowadays in favor, as it tends to keep alive that interest in the traditions of the past which many consider harmful and cramping. But, in my opinion, there is no better training for an architect than the study and analysis of buildings, both old and new; it helps you to cultivate a sense of proportion, to appreciate the beautiful in art, and, more than anything else, the means by which these results were attained.

Apart from anything else, it teaches you to draw in perspective, to see your buildings in the round, a point I have already urged. It is an invaluable aid in designing to be able to draw your schemes cleverly and rapidly, for, as you know, designs which look well in elevation, often look very different in perspective. Cultivate a good style of draughtsmanship, but remember that the object of all architectural drawing is clearly to explain your designs to those who will carry them out, so that all tricks and mannerisms should be avoided which do not convey any practical meaning.

In these days, when traveling is so easy, you should take every opportunity of studying and comparing in each country you go to the different ways in which similar problems are treated, and the materials and workmanship with which they are carried out; this will broaden and enlarge your mind, and you will gain many valuable lessons in design and construction. But do not sketch or measure with the object of copying old forms and features, for mere servile imitation is a sure sign of decadence and lack of creative force. At the same time avoid going to the other extreme, and in your efforts after so-called originality becoming "banal" and grotesque. Guard against being carried away by the love of the pretty and picturesque, the passing fashion of the hour, and recollect that eccentricity is not synonymous with genius. Do not worry over trifling details, trivial mouldings, and such things; the greatest and noblest buildings and those that impress us with their breadth and dignity, as a rule, are very simply treated. You know that ornament must follow good construction, and that this again must be based on the proper use of material, and. though the tendency of the day is to try to be original, to produce something fresh and striking, yet I venture to think, and indeed hope, that much of what we see around us is only ephemeral and will not hold its place in years to come, as representative of our architecture to-day.

Beauty in architecture does not result from richness of material and profusion of ornament, but from elegance of form and proportion, harmony of color, and perfection of execution; and in a large measure from the intelligent application of material to its proper purpose. Many do not sufficiently remember this, and forget that all materials have their limitations and uses; so consider well the suitability of your designs to the materials you would build them in. Details and features that are right in one are wrong and out of place in another. It is unnecessary to urge you again to err on the side of simplicity and restraint in your work. Everyone can crowd his design with meaningless ornaments and detail, but few have the power of being able to know exactly what to use and what to omit. This can only be gained by careful study, by thought and experience, and though at times you may get discouraged and feel that your work is at a standstill and you are not improving, yet this very dissatisfaction may be the means of benefiting your work in the future.

It will encourage and help you, if you will devote some of your leisure to reading the lives and biographies of our great architects and artists. You will find that they had the same troubles and difficulties to overcome that you are bound to meet with in your career, and that they learned in the hard school of experience, just as you will do.

You should lose no opportunity of visiting buildings in progress, and of going to see workshops and accustoming yourselves to actual materials and how they are used. The spring and summer visits arranged by the Association to buildings are admirable, and should be better patronized than they are. If students could get a few months, or even longer, on a building in progress, the advantages would be inestimable, for there is nothing that is so useful as practical knowledge gained first hand. This, again, bears on that very debatable question of craftsmanship, on which several papers have been lately read.

THE FUNCTION OF AN ARCHITECT.

I cannot help feeling that if a man means to be an architect all his time and thought must be concentrated on his work and in that direction alone, and to attempt to make himself master of any of the subsidiary crafts, to work with his own hands on buildings of his own is a mistake. I have never been able to ascertain that any of the greatest architects of the past were craftsmenn in the sense that we use the word to-day, and I do not think that any work in any of their known buildings can be pointed to as actually executed by them. The function of an architect should be to design and have the control of the entire building, to be the master builder, in fact, and to be conversant with all the work being done. He should, as far as possible, have a knowledge of the technique of the various trades and crafts, and be able in a general way to direct and control them all, but more than this seems unnecessary. To concern himself personally with matters of actual craftsmanship must be to the detriment of his buildings, because an architect cannot carry out the multifarious duties required to-day and find time to do these things as well; though of course if an architect wishes to work with his own hands, and has a tendency that way, he will doubtless produce excellent results, but the idea in buildings of any magnitude or importance seems out of the question. Do not be led astray with theories such as these, but try and gather round you artists and craftsmen in the allied arts, who understand and sympathize with your aims and who will work with you. That is what all our great architects have done and what we should try and do to-day.

In conclusion, cultivate that spirit of comradeship with your fellow students which has always been one of the chief aims of the Association, and if you possibly can, take some part, however small, in the good work it is doing. The aim of the Association has always been to help its members, and this is the spirit that has enabled it to maintain its almost unique position. It may be your lot to stand by the wayside and see others pass you in the race of life, for its prizes are only for the few; but do not be discouraged, for if you do the work, however small, which comes to your hand to the best of your ability and power, it will not only bring its own reward, but will help and encourage those around you to follow your example.

FERRO-CONCRETE*

MR. W. DUNN said that, owing to many unpleasant experiences, there was a feeling among many architects and builders that concrete was a treacherous and unreliable material. In all such experiences there was something mysterious; the cement came from a maker of established repute, it had been specified "Best London" Portland cement, the sand and gravel looked clean, and the builder was an honest man. Nevertheless, it failed to set; it cracked; it thrust out the walls, and generally led to a great deal of trouble. To make good concrete much care in the selection of the materials and in the mixing was required. The cement was the most important ingredient, and the only way to get good cement was to test it constantly and reject that which was faulty. That was the only way to insure that only good cement was used. If the fact that it is frequently tested becomes known to the merchants, it will be found that a dangerous article, such as bad cement is, would be less and less frequently sent. When floors, walls, roofs, or pillars are made of concrete, a bad cement is really dangerous to life. It would be an excellent plan if the Institute, the Builders' Institute, and the cement makers could agree upon a standard suitable for architectural work. But until such a standard was fixed, architects must describe it themselves in their specifications. Many cement experts had given model specifications, but there are some points in cement specification required for building work which a cement expert scarcely values.

Fineness of grinding is all important, as only the very fine particles have cementitious value. Foreign makers were much ahead of us a year or two ago; now we can get English cement which will all pass a 76 by 76 and leave only 10 per cent. on a 180 by 180 sieve.

This is a very fine cement, and perhaps too good for ordinary work. All, however, should pass from 50 by 50 and leave only 5 per cent. on a 120 by 120 sieve. A good cement is economical; we make a stronger mortar or concrete with much less of it, so that the extra cost is more than repaid. The particles which are retained on a 50 by 50 sieve are practically so much sand.

The author strongly urged the use of a slow-setting cement. Pats made with the *minimum* quantity of water should set in not less than five hours when the temperature is at 34° F., and in not less than twenty minutes when the temperature is at 75°, and proportionately in time when the temperature is between these points.

Soundness or constancy of volume is one of the most important qualities a cement should have. Tests without elaborate apparatus are fortunately available. Make two cement pats on small pieces of glass, tap them out to a circular shape, about 3 in. diameter, ¼ in. thick in the center, and with thin edges; keep one under water and one in air for several days. The cement should then show no cracks, change of shape, or tendency to curl off the glass, if sound. The author went on to describe other methods of testing, and strongly urged architects to test their cements by one and all of them as often as they could. It would save many after troubles.

Tensile strength he regarded as the least important; it is the test on which the most varied results may be got by different observers according to the method employed in filling the briquettes. A strength of 400 lbs. per sq. in. at seven days and 25 per cent. increase in twenty-eight days is usually asked for and easily attained; many briquettes he had found go up to nearly 1,000 lbs. at seven days.

It is not unusual to specify that sufficient cement should be delivered on the works at starting, kept stored in a dry weather-proof shed to a depth of not more than 2 ft. and turned over daily for a fortnight before use. It is found that makers send out the cement hot from the mills, and (unless it is a very high-class cement), it is much improved by air slaking. Aeration seems to improve an inferior cement by the slaking of the free lime, which if it took place in the work would be dangerous. A thoroughly sound cement should have no free lime in it, and is not improved by air slaking; it rather suffers; cement in which there is no free lime can be produced by the maker, but it requires much care in the making, and is consequently expensive.

As regards the aggregate, the strongest concrete is made with broken stone and gravel; the size should vary from large sand to small stones, passing a 1-in. mesh for floors or walls, to 1½-in. or even more for foundation. The cleanliness of the aggregate and the water is most important, as is also the cleanliness and sharpness of the sand. Small sand, such as would run in an hour-glass, is utterly useless—the sand must be fairly large and sharp; it should vary in size; the more uneven the sizes the smaller the voids. The finer the sand the less the strength.

* Abstract of a paper by Mr. W. Dunn, read at a meeting of the Royal Institute of British Architects.

There should never be more than three of sand to one of cement.

The author described the process of mixing concrete, which should always be done under supervision. Concrete mixing machines are much used in America and on the Continent, producing very good and uniform results. These machines are rarely seen here. One has frequently seen on a building a lot of concrete mixed up, and left for an hour or so before being set in place. If too stiff more water was added. Such treatment of the material invites disaster; initial set begins very quickly, and the concrete should be put in position as soon as mixed, and without a moment's delay. When the concrete is eventually laid on the centering, or put in the moulds, it is put in in thin layers 2 in. to 3 in. thick, and beaten down with iron beaters very carefully all over. This is essential in order to prevent the formation of voids, and to increase the resistance of the concrete.

The resistance of the swelling and bursting action to which columns in concrete alone would be subject, can be produced by binding the columns with iron or steel wire. Makers of concrete columns do so bind these according as the effect to be combated is more or less clearly understood. What is done in the Hennebique column is done by other concrete specialists. In all there is first the concrete; second, vertical bars of metal, iron or steel; third, bindings or sheet metal or wire.

The method of construction is very simple.

A wooden box or mould is made in which the rods are set upright; one of the bindings is then put in, and about 6 in. or 12 in. of concrete well rammed down; another of the bindings is put in and the process repeated.

The special functions of the vertical rods are (*a*) to aid the concrete in resisting the compression due to the load; (*b*) to resist any tensile stress which may be set up in the concrete by unequal loading or by any want of homogeneity in the material itself, which tensile stresses cannot be safely left to the concrete to overcome.

Almost all the makers of reinforced concrete constructions put their trust in the vertical rods of metal, as the special element adding strength to the concrete, if we may judge by the large proportion of metal so used, and by the rules employed to fix the safe load, which rules take no account of the binding.

If there were no initial stresses in the combination the load would be carried by the two materials on the inverse proportion of their rigidities; that is to say, if the concrete were ten times as easily compressed as the iron or steel, the iron or steel would be carrying ten times as much per square inch as the concrete.

But the question is not so simple. Concrete setting in air shrinks, while concrete setting in water expands. Columns for buildings always set in air, and consequently the concrete shrinks. As the concrete adheres rigidly to the metal, the concrete is put in tension and the metal in compression—into a state of internal initial stress—before the load comes on. So strong is this action that the concrete may be at the limit of its tensile strength, and the metal at its elastic limit. No formula has so far been devised which takes this initial stress into proper account.

The function of the bindings is to prevent lateral swelling and bursting. M. Considere was the first to give this its proper consideration and importance. In almost all columns, except M. Considere's, these bindings are usually about 6 in. to 12 in. apart, showing that the true use of the metal is not yet fully recognized.

LOCKS AND BUILDERS' HARDWARE *

THE author is Mr. Henry R. Towne, President of the Yale & Towne Manufacturing Company (also one of the past presidents of the American Society of Mechanical Engineers), one of the oldest and largest concerns engaged in the manufacture of locks and builders' hardware, whose well known works are located at Stamford, Conn. Mr. Towne's long experience in the business and the large scope and high quality of the products of his works have given him exceptional facilities for studying his subject, and for discussing it intelligently in all of its phases of characteristics, production and uses. As stated in the preface, it was necessary in the practical treatment of the subject to refer specifically to some existing and complete line of the product under discussion, and the author has not hesitated to avail frankly of the one with which he is most famliar and which is best suited to his purpose. While this has unavoidably involved frequent reference to the Yale & Towne Manufacturing Co. and its products, the volume is in no sense a trade catalogue nor an advertisement, but in every sense of the word a technical treatise on the subject of Builders' Hardware, which, as the author states, is one of the minor but essential handmaids of architecture.

The volume, which is profusely illustrated, probably with some thousands of pictures, includes an historical review of its subject, technical descriptions of the leading facts of locks and their component parts, a detailed enumeration of the many articles included under the comprehensive term "Builders' Hardware" in their many forms and designs, and a very full discussion of the subject of architects' specifications relating to the selection and furnishing of Builders' Hardware.

A feature of special interest and value is a series of articles by Mr. W. W. Kent, architect, on the "Schools of Ornament," elaborately illustrated with pictures culled from many sources, setting forth briefly but clearly the origin and characteristics of nearly all the recognized schools into which architectural designs and ornament have been classified.

The volume is designated "A Hand Hook for Architects," and is intended for practical use by them in their daily work. Therefore it not only contains a vast amount of technical information, advice and suggestion, but also a scale of prices whereby the approximate value of hardware of almost every kind and grade may readily be ascertained with sufficient accuracy at least for the purposes of preliminary estimates. The method of doing this is novel, and, while perhaps somewhat difficult to understand at first glance, is, in fact, so simple that when once understood it can be made use of with great facility and should prove a very useful feature in practical work.

Taken as a whole the volume is unique in many respects, is the first ever published treating comprehensively of the subject to which it relates, and contains so much material of general interest in addition to its more technical contents as to make it worth inspection if not careful reading by everyone concerned, either directly or indirectly with the production, selection and use of Builders' Hardware.

* A handbook for architects, by Harry R. Towne. Press of John Wiley & Sons, N. Y.

WESTINGHOUSE TURBINES

AN interesting feature of the recently announced development in the Baltimore Electric Power Enterprise is the exclusive adoption of steam turbines as the prime mover. A contract recently closed with the Westinghouse Machine Company provides an initial equipment of 4,000 kw. in two generating units of 2,000 kw. each. A Westinghouse electrical equipment, complete and modern in every particular, has also been contracted for. Officers of the company state the power plant will embody the latest developments in steam and electrical engineering. The building is to be of fireproof construction throughout, the structural steel frame also serving as supports for the boilers and the overhead coal bunkers. Being located outside of the congested districts of the city, all the boilers and heavy machinery will be on the ground floor. Floors and roofs will be of steel-concrete construction. The company has secured a lot fronting on Gould street and extending to the Patapsco River. This property comprises 6.4 acres and by filling in to the wharf line, over three acres will be added to the area, which will give the company sufficient space to take care of the electrical needs of Baltimore for a long period. The location of the plant on the water front, with the Baltimore & Ohio and Wabash Railroad system adjoining, affords ample facilities for securing coal either by rail or water. The distance from the center of the city to the new power house is about two miles and a half.

The steam turbine plant will operate with a boiler pressure of 175 lbs., and a superheat of about 100° Fahr. A high vacuum condensing system will be installed, capable of sustaining a vacuum of 28" at full load on the plant.

The plant in its entirely has been designed on the separate unit plan, which virtually consists of a number of distinct power plants placed side by side, each entirely separate from the other, but each capable of helping out the other in case any link in the system should be disabled. This holds good through the coal-handling apparatus, the boilers, steam piping, turbines, condensers, generators, switchboard, underground cable, etc., from the coal pile to the customer's building. In addition to this precaution against interruption of service, which is thus insured, the company will install a large storage battery which will ordinarily "float" on the system.

OUR ILLUSTRATIONS

Interior view, National Bank of St. Joseph, Mo. Jenney & Mundie, architects, Chicago.

New Postoffice, Oakland, Cal., J. Knox Taylor, architect.

Apartment Building, Chicago, S. N. Crowen, architect.

Residence, Evanston, Ill., E. A. Mayo, architect, Chicago.

Residence, W. R. Donaldson, St. Louis, Mo., Weber & Groves, architects.

Fountain Park Cong. Church, St. Louis, Mo., Weber & Groves, architects.

Residence of Governor Herrick, Cleveland, O., Mead & Garfield, architects.

Entrance Detail, Conservative Life Building, Los Angeles, Cal., Train & Williams, architects.

Store Building, Pasadena, Cal., John Parkinson, architect.

Residence, Toledo, O. Geo. S. Mills, architect.

Club House, San Jose, Cal.

Special Plate—Residence, Evanston, E. A. Mayo, architect.

SPECIAL PLATES.

Issued only with the photo-gravure edition.

Interior Views, Residence. Frederick W. Perkins, architect, Chicago. Views in Dining Room and View in Library are shown.

Residence. E. A. Mayo, architect, Chicago.

Railway Station, Muskegon, Mich.

Apartment Building, Chicago. Borst & Hetherington, architects.

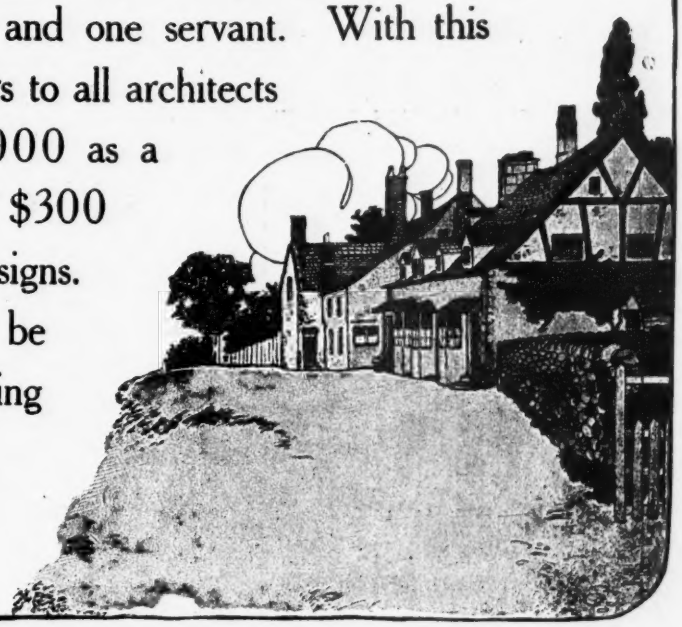
Public School, St. Louis. W. B. Itner, architect.

Residence. E. A. Mayo, architect, Chicago.

$1000 for a $3000 House

THE LADIES' HOME JOURNAL wants a good design for building a $3000 house for the comfortable home of a young couple with one child and one servant. With this idea in mind the magazine offers to all architects in America and England $1000 as a first prize; $500 as a second; $300 for a third, etc., for the best designs. A full circular of details will be sent to any architect by addressing

THE ARCHITECTURAL EDITORS
THE LADIES' HOME JOURNAL,
PHILADELPHIA, PA.



THE NATIONAL WOOD FLOOR CO.

Manufacturers
of
Parquet Floors
National Hard Finish
National Wax Polish

Established 1869

186 FIFTH AVENUE AND
10 W. 23d STREET, NEW YORK

FOR INFORMATION ABOUT

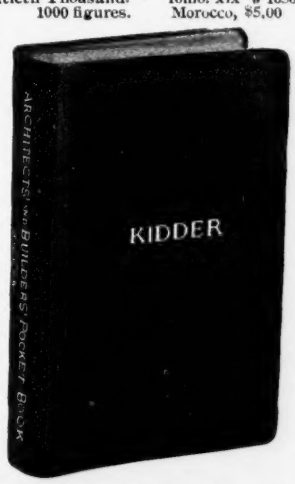
U. S. MAIL CHUTES

WHICH ARE
A necessity in office buildings and hotels, write to the sole makers,

THE CUTLER M'F'G CO., Rochester, N. Y.
PATENTED. AUTHORIZED.

THE J. W. REEDY ELEVATOR CO.
Passenger and Freight
ELEVATORS.
83 to 91 Illinois Street, CHICAGO.
31-33 Tenth Avenue, NEW YORK CITY.

NOW READY
THE FOURTEENTH EDITION OF
Kidder's Architects' and Builders' Pocket-Book
Twentieth Thousand. 1000 figures.
16mo. xix + 1656 pages Morocco, $5.00



No Architect, Structural Engineer, Contractor or Draftsman can afford to be without a copy of this new edition.

JOHN WILEY & SONS
43 and 45 East Nineteenth St., New York City.

"Big Four" Route.

CHICAGO
TO
INDIANAPOLIS,
CINCINNATI,
LOUISVILLE.

SOUTH and SOUTHEAST

THE SCENIC LINE TO
Hot Springs, Va., and
Washington, D. C.
Via the
Chesapeake & Ohio Ry.

J. C. TUCKER, G. N. A.
238 Clark Street, CHICAGO.

Please mention THE INLAND ARCHITECT when corresponding with Advertisers

DRAFTSMAN WANTED

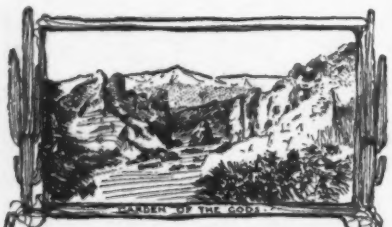
First Class Architectural Draftsman. State age, experience, salary and references.

Alfred Giles, Architect, San Antonio, Texas.

DRAFTSMEN WANTED

I need two Draftsmen, one must be first class at preliminary work and rendering and the other good at working drawings.

R. H. Hunt, Chattanooga, Tenn.



COLORADO'S COOL RESORTS

BEST REACHED VIA

MISSOURI PACIFIC RAILWAY

"Colorado Short Line"

—TO—

UTAH AND PACIFIC COAST

THROUGH

PULLMAN SLEEPING CARS, FREE RECLINING CHAIR CARS, DINING CARS (MEALS A LA CARTE), ELECTRIC LIGHTS AND FANS.

For further information, address Company's Agents, or

H. C. TOWNSEND,

GENERAL PASSENGER AND TICKET AGENT, ST. LOUIS.

$33 To the Pacific Coast

Every day, September 15 to October 15, from Chicago. Via The California Express and Omaha; The Pioneer Limited through St. Paul and Minneapolis; or The Southwest Limited and Kansas City if you select the

Chicago, Milwaukee & St. Paul Railway

Only $33.00, Chicago to San Francisco, Los Angeles, Santa Barbara, Portland, Tacoma, Seattle and many other Pacific Coast points. Only $30.50, Chicago to Spokane; $30.00, Chicago to Helena and Butte, Ogden and Salt Lake City.

For Free Books and Folders kindly Fill Out This Coupon and mail to-day to

F. A. MILLER, G. P. A., The Railway Exchange, Chicago

Name_____

Street Address_____

City_____, State_____

Probable Destination_____

National Fire Proofing Company

STANDARD METHODS OF

HOLLOW AND POROUS TILE FIREPROOFING

OFFICES

BESSEMER BUILDING	PITTSBURGH
170 BROADWAY	NEW YORK
NORTH AMERICAN BUILDING	PHILADELPHIA
TREMONT BUILDING	BOSTON
HARTFORD BUILDING	CHICAGO
15 WEST SARATOGA STREET	BALTIMORE

We own patents for the Johnson System of Fireproofing. Residences and other buildings can be made fireproof without the use of steel.

LET US GIVE YOU ESTIMATES

PIONEER

FIRE-PROOFING COMPANY

1515 Marquette Building

CHICAGO

CONTRACTORS FOR FIRE-PROOFING OF BUILDINGS

MANUFACTURERS OF CLAY PRODUCTS

LOUIS J. MILLET

(Successor to HEALY & MILLET)

Interior Decorator

181 MICHIGAN AVE., CHICAGO

Leaded Glass. Glass Mosaic. Frescoing

CRANE VALVES

ESTABLISHED 1855

Please mention THE INLAND ARCHITECT when corresponding with Advertisers.

Mr. Architect: REASONS WHY YOU SHOULD USE

Dexter Brothers' English Shingle Stains

BECAUSE they will outwear paint or any other stain.
BECAUSE they preserve the shingle.
BECAUSE they do not give a painted effect to the shingle.
BECAUSE they do not change as other stains do.
BECAUSE they have no disagreeable odor.
BECAUSE they are used on the best work from Maine to California.
BECAUSE they are used by people who want the best of everything.

Exclusively used on the shingled country houses of *Mr. George Vanderbilt* at Biltmore, *Mr. J. Pierpont Morgan*, Adirondacks, *Hon. Wm. C. Whitney*, Westbury, L. I., *Mr. Thomas W. Lawson*, Egypt, Mass.

Manufactured by

DEXTER BROTHERS COMPANY
103-105-107 Broad Street
BOSTON

H. M. HOOKER CO., Agents
57 W. Randolph Street
CHICAGO

F. H. McDONALD, Agent
GRAND RAPIDS, - MICH.

W. S. HUESTON, Agent
24 East 22d Street
NEW YORK

MINNEAPOLIS AND ST. PAUL

ILLINOIS CENTRAL RAILROAD
CENTRAL MISSISSIPPI VALLEY ROUTE

FINE SERVICE FROM CHICAGO

New First-Class Through Line
from Chicago via Dubuque, Waterloo and Albert Lea. Fast Vestibule Night train with through Sleeping Car, Buffet-Library Car and Free Reclining Chair Car. Dining Car Service en route. Tickets of agents of I. C. R. R. and connecting lines.
A. H. HANSON, G. P. A., CHICAGO.

ESTABLISHED 1872 INCORPORATED 1890

71 & 73 Randolph Street.

MANUFACTURERS, WHOLESALE AND RETAIL DEALERS

Builders' Hardware

ART METAL-WORK OF ALL KINDS.

Cooling Rooms.

Mechanics' Tools.

Table and Pocket Cutlery.

Our selection comprises THE BEST from all the leading factories, as well as our own, and our heavy purchases enable us to offer you these goods at prices which can not fail to please.

We have many specialties which we manufacture and control which can not be found anywhere else.

Orr & Lockett Hardware Co.

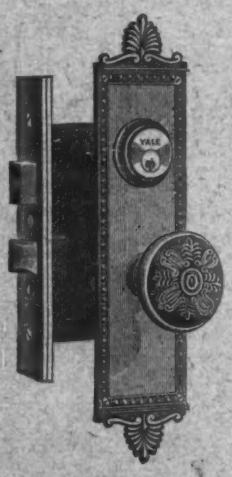
71 & 73 RANDOLPH STREET.

Telephone, Central 551.

THE YALE & TOWNE

Mfg. Co., General Offices:

9-11-13 Murray St., New York,

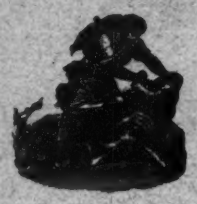


Produce the HARDWARE OR ORNAMENT (comprising decorative metal work for doors, windows and cabinets) in practically all schools, and a great variety of finishes. Examples can be seen in the Exhibit Rooms maintained by the Company in its General and Branch Offices.

Special Brochures, of technical interest, furnished to Architects on request.

CHICAGO OFFICE:

No. 131 Wabash Avenue.



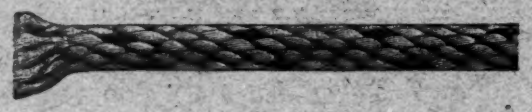
SAMSON SPOT CORD

Costs Less and Wears Longer Than Chain

SEND FOR SAMPLES, TESTS, ETC.

Samson Cordage Works

Boston, Mass.



A Shine That Stays On

is the kind of finish your clients will get if the interior woodwork is varnished with

I. X. L. Preservative Coatings

WRITE FOR VARNISH INFORMATION

EDWARD SMITH & CO.

Varnish Makers and Color Grinders

45 Broadway, New York,
59 Market Street, Chicago.

New Pittsburg Service

VIA

The Lake Shore Limited

A Through Pullman Sleeper is now in daily service between Chicago and Pittsburg on the LAKE SHORE LIMITED, affording Pittsburg travel all of the luxurious accommodations of this famous train.

Leaves Chicago	Arrives Pittsburg
5.30 p. m.	6.35 a. m.

ADDITIONAL SERVICE AS FOLLOWS:

Leave Chicago, 8.30 a. m.	Arrive Pittsburg, 9.45 p. m.
Leave Chicago, 10.35 p. m.	Arrive Pittsburg, 11.15 a. m.

City Ticket Office, 180 Clark St.
CHICAGO

A. J. SMITH
Gen'l Pass'r and Ticket Agt.
CLEVELAND

C. F. DALY
Chief Ass't Gen'l Pass'r Agt.
CHICAGO